

August 1980

\$2.00

Personal Computing

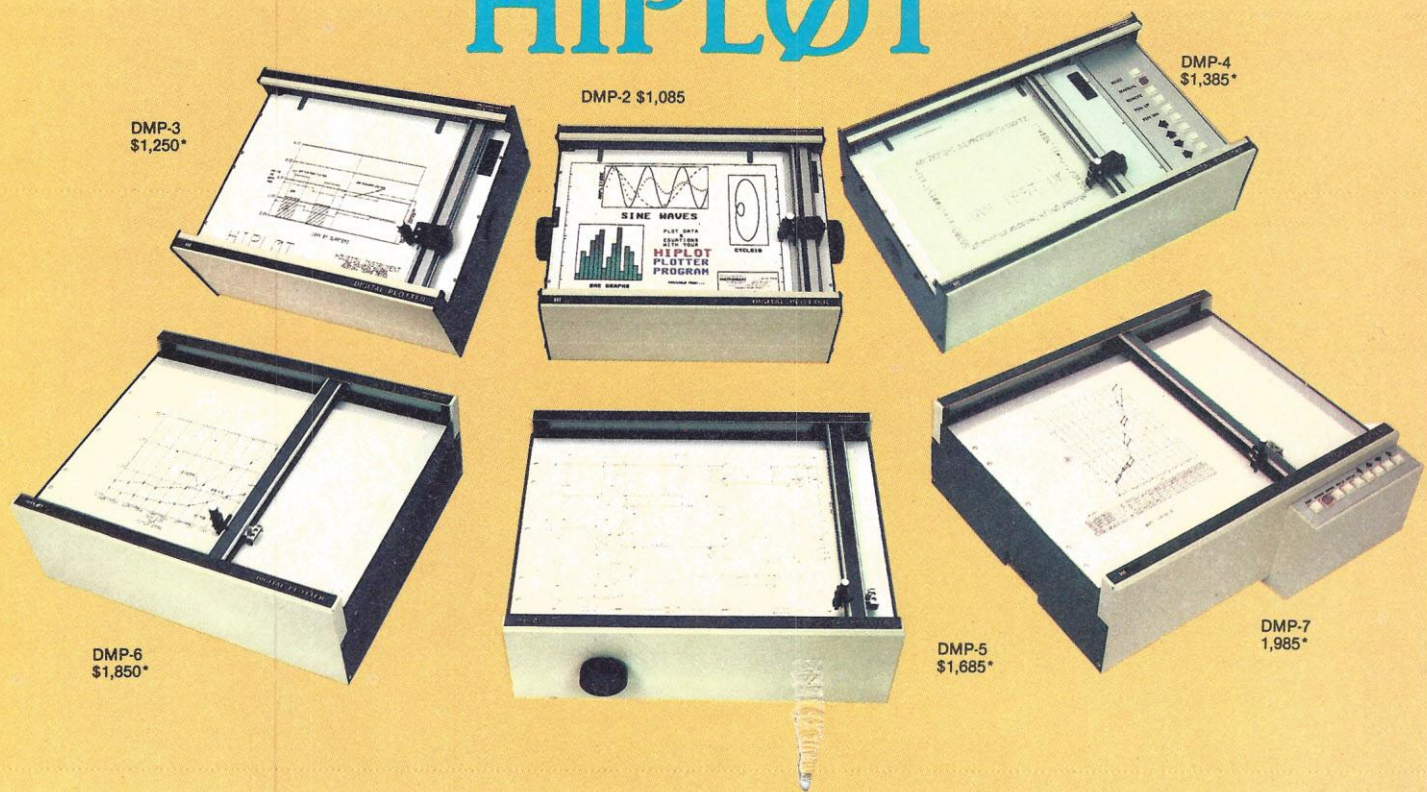
For Your Home and Business

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in
Education



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Apple III
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Look what's happened to HIPLØT™



It's grown into a complete family of quality low cost digital plotters

*Yes, they are UL listed! ***

In just two short years, The HIPLØT has become the most popular digital plotter among small systems users. With a record like that, what can we do for an encore? WE'VE INTRODUCED A COMPLETE LINE OF HIPLØTS...with a model suited for just about every plotting application.

The HIPLØT DMP Series is a new family of digital plotters with both "standard" and "intelligent" models available with surface areas of 8½" x 11" (DIN A4) and 11" x 17" (DIN A3). For the user needing a basic reliable plotter, we have the "old standard" DMP-2 (8½" x 11") and the "new standard" DMP-5 (11" x 17"). For those needing a little more capability, there are the DMP-3 (8½" x 11") and the DMP-6 (11" x 17")—both

microprocessor controlled and providing easy remote positioning of the X and Y axes (perfect for the OEM). For those who want this intelligence plus the convenience of front panel electronic controls, we've provided the DMP-4 (8½" x 11") and the DMP-7 (11" x 17").

The "standard" plotters come complete with an RS-232-C and a parallel interface. The "intelligent" DMP plotters accept data from either an RS-232-C or Centronics data source. For the "standard" plotters, software is available from our ever expanding "Micrographic Users Group." The "intelligent" HIPLØTs use our exclusive DM/PL™ language which minimizes plot software to a fraction of that normally as-

sociated with digital plotting.

With the new DMP Series, high quality digital plotting can now be a part of your system. It just doesn't make sense to be without this valuable tool when there is a DMP plotter with the plot size, speed and capabilities that are exactly tailored to your specific needs...and your budget.

Prices for the DMP series range from \$1,085* to \$1,985*. For complete information and descriptive literature, contact Houston Instrument, One Houston Square, Austin, Texas 78753. (512) 837-2820. In Europe contact Houston Instrument, Rochesterlaan 6 8240 Gistel, Belgium 059/277445. For rush literature requests and sales office information, persons outside Texas call toll free 1-800-531-5205.

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houston instrument
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CIRCLE 2

*U.S. suggested retail prices only.
**DMP 2, 3 and 4 UL listed
DMP 5, 6 and 7 UL listing pending

Mountain Hardware makes more peripherals for the Apple Computer than Anybody.

and . . .
a place to put them

INTROL X-10

Intelligent Home Controller for lights and appliances. Real-time schedules and energy conservation. Complete applications software package. Home security with random scheduler. Power usage accounting package for home energy cost control. No wiring required.

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Real-time and date information. Interrupts permit Foreground/Background operation of two programs simultaneously. Battery back-up. Crystal-controlled for $\pm .001\%$ accuracy. Onboard ROM for easy access from BASICs. Supports PASCAL. Time from one millisecond to one year.

SUPERTALKER SD200

Input/Output Speech Digitizer. Permits talking programs. I/O capability allows interactive programs with speech-prompted inputs. Use output for speech directed activities in business systems, announcements in a control-room, or sound effects in entertainment programs. Easy to use because input as well as output is under user control with special software operating system.

ROMWRITER

Program your own EPROMs. Create your own firmware. Programs 2K, 2716 5V EPROMs. Disk software package provides easy EPROM programming. EPROMs are verified after BURN. RUN your programs from on-board socket or install them on ROMPLUS+.

ROMPLUS+

More power for your system through firmware. Six sockets accept 2716 EPROMs or ROM equivalents. Six or any combination can be used at once. Scratch-pad RAM and two TTL connectors. Special 2K ROMs available for powerful system enhancement: Keyboard Filter ROM—COPYROM—Others coming soon.

MusicSystem

Sophistication previously available only on experimental mini and mainframe computer synthesizers. Digital instrumental music synthesizer system. 16 voices in stereo. Instrument definitions simulate the sound of real instruments—and more. Fully programmable waveforms. Envelope Control. Composition system—sheet music input using standard music notation. Chords and multi-part scoring up to 16 voices. A true instrument that anyone with an Apple can play.

A/D+D/A

16 channels analog to digital input. 16 channels digital to analog output. Eight bit resolution. Super-fast 8μ sec. conversion time. Monitor and output to the real world. All on one card.



EXPANSION CHASSIS

By popular demand! Eight more slots for your Apple. Attractive sturdy enclosure. Its own heavy duty power supply. Easy to use. Address cards in Expansion Chassis the same way as in your Apple. Only one additional command to specify in Apple or in Expansion Chassis. Compatible with all Apple peripherals.

MOUNTAIN HARDWARE has the most comprehensive line of Apple peripherals available. Anywhere. From anybody. We know the Apple inside and out and are committed to providing the most innovative and unique products to expand and enhance its capabilities and use. After all, we were the first company to make an Apple peripheral—except Apple Computer.

The message is simple. If you have an Apple, you need to know MOUNTAIN HARDWARE.

Available at Apple Dealers worldwide.



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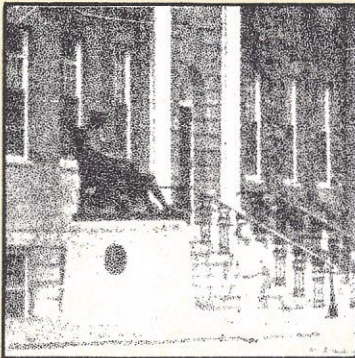
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Personal Computing

For Your Home and Business



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Cover design by Stephen C. Fischer
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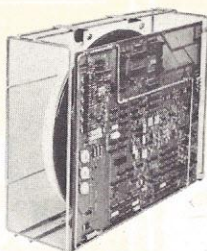
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PRIAM Hard Disks Now Available from SIRIUS SYSTEMS!



PRIAM's high-performance, low-cost Winchester disc drives speed up throughput and expand data storage from 20 megabytes to 154 megabytes. And a single controller can be used to operate 14-inch-disc drives with capacities of 33, 66, or 154 megabytes or floppy-disc-size drives holding 20 and 34 megabytes. So it's easy to move up in capacity, or reduce package size, without changing important system elements or performance.

- Fast, Linear Voice Coil Positioning
- 10 ms track-to-track positioning
- Fully servoed head positioning
- Dedicated servo tracks
- DC Power required only!
- Simple, parallel Interface
- Optional SMD Interface
- 50 ms Average Positioning time
- 90 ms Maximum Positioning Time
- 6.4 ms Average Latency

THE PRIAM LINEUP

Model/Disk Size	Capacity	Size	Weight	Price
DISKOS 3350 (14")	33Mbytes	7" x 17" x 20"	33 lbs.	\$2995
DISKOS 6650 (14")	66Mbytes	7" x 17" x 20"	33 lbs.	\$3749
DISKOS 15450 (14")	154Mbytes	7" x 17" x 20"	33 lbs.	\$4695
DISKOS 2050 (8")	20Mbytes	4.62" x 8.55" x 14.25"	20 lbs.	\$2995
DISKOS 3450 (8")	34Mbytes	4.62" x 8.55" x 14.25"	20 lbs.	\$3745
DISKOS 570	5.3Mbytes	floppy-size	(low)	(low)
DISKOS 1070	10.6Mbytes	floppy-size	(low)	(low)

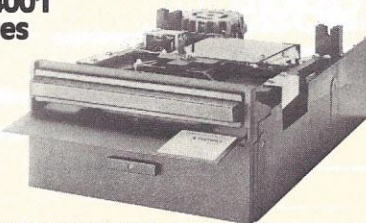
All PRIAM DISKOS Drives have a Transfer Rate of 1.03 Mbytes/Sec.
Optional SMD interface available for \$150.

SIRIUS SYSTEMS offer cases and enclosures for all PRIAM Hard Disk Drives. All 14" Winchester Drives will mount in our 14" Standard Case. The 8" Winchester have two alternatives: a single drive case and a dual drive case. All SIRIUS SYSTEMS Winchester drive cases include Power Supply, internal cabling, switches, fan, extra AC outlet (not switched, but fused) and possess very adequate ventilation. Drive addressing is done on the rear of the Case and not on the drive itself to provide ease of use during operation. All WINCHESTER DRIVE Cases are Warranted for a full year and come in our standard blue-black color scheme. Consult us for current availability and pricing.

Remex RFD 4000/4001 8" Floppy Disc Drives Double sided ... Double density!!

\$549⁹⁵

RFD 4001, \$569.95



Offers quality and features found in drives costing much more! ■ Single or Double Density ■ Double-Sided Drive ■ Door Lock INCLUDED ■ Write-Protect INCLUDED ■ 180 Day Warranty ■ Compatible with Shugart 850/851 ■ Low Power Operation ensures LONGER LIFE!! ■ Model RFD 4001 offers Data and Sector Separator

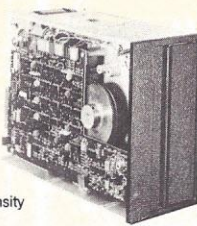
RFD 4000/4001 Technical Manual	6.95	RFD 4000C/B Cabinet (for use with	
Connector Set #3 (AC, DC, Card Edge)	10.95	Power Modules)	29.95
Connector Set #4 (AC and DC)	2.95		

Remex 1000B ... If you've been looking for a less expensive floppy disc drive, but not wanting to sacrifice quality— this is it!

\$419⁹⁵

You get both in the Remex 1000B! For only \$419.95 look at what you get: ■ 8" Floppy Drive ■ Single or Double Density ■ Hard or Soft Sectoring ■ Media Protection Feature ■ Single Density Data Separator ■ 180 Day Factory Warranty

Door Lock Option	\$19.95	Write Protect Option	\$19.95	RFD 1000B Technical Manual	\$5.95
Interface Adapter		Connector Set #1		RFD 1000B CASE (for use	
(REMEX-to-Shugart)	\$14.95	(AC, DC, & Card Edge)	\$10.95	(with Power Modules)	\$29.95



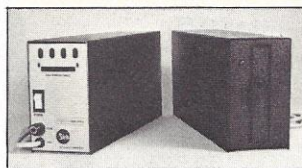
SIRIUS 8" DISK POWER MODULES

The Single and Dual Drive Power Modules are designed to provide DC and (switched) AC power for one (the Single Drive Power Module) or two (the Dual Drive Power Module) the DDPM will power three RFD 4000s or 4001s 8" Floppy Disk Drives. Many features are included for safe and reliable operation and the Power Modules come with our stan-

dard 180 day WARRANTY (the Open Frame Power Supply warranty is for 2 years). All Power Modules will work with either the RFD 4000C/B or RFD 1000B case (color schemes match also).

Dual Drive Power Module (DDPM)	\$139.95
Single Drive Power Module (SDPM)	119.95

SIRIUS 80+ Perfect Add-Ons for Your Computer System!



The SIRIUS SYSTEMS 80+ Series of Floppy Disk add-ons are designed to provide unmatched versatility and performance for your computer. Consisting of four different add-ons, there is a 80+ Series Floppy Disk to meet your need. All 80+ Series Floppy Disk are compatible with the TRS-80+ and come ready to plug in!

COMMON CHARACTERISTICS

- 5 ms track-to-track access time
- Auto-eject
- 180 day WARRANTY
- Exceptional speed stability — 1 1/2%
- Single density (FM) or double density (MFM/M2FM)
- Ultra high reliability
- 2 year Power Supply Warranty
- Mix any or all 80+ Series on the same cable!
- Includes user accessible plugboard for drive reconfiguring

SPECIFIC CHARACTERISTICS

The SIRIUS 80+1 is a single sided, 40 track, highly reliable Floppy Disk add-on. Offering 5 more tracks than the Radio Shack model, it cost \$140 less! Formatted data storage is 102K/20K bytes single/double density.

SIRIUS 80+1\$359.95

The SIRIUS 80+2 is a dual sided, 70 track (35 per side), highly versatile Floppy Disk unit. It appears to the TRS-80+ as TWO 35 track drives, yet COST LESS THAN HALF THE PRICE! Even greater savings result, since data is recorded on both sides of the media instead of only a single side. Using the plug board, it may be reconfigured for other computer systems! (The 80+2 operates as Drive 0 and any of the other three addresses (with the standard Radio Shack Cable) or as any of four drives (with the SS Standard Cable).) Formatted data storage is 80.6K/161.2K bytes single/double density.

SIRIUS 80+2\$449.95

The SIRIUS 80+3 is a single sided, 80 track, "Quad" density Floppy Disk unit. Offering 2 1/2 times the storage of a Standard Radio Shack drive, the 80+3 greatly reduces the need for diskettes correspondingly. Additionally, because of the increased storage and faster track-to-track access time, the 80+3 allows tremendously increased throughput for disk based programs!! The 80+3 INCLUDES SIRIUS's TRAKS-PATCH on Diskette. Formatted data storage is 204K/40K bytes single/double density.

SIRIUS 80+3\$489.95

The SIRIUS 80+4 Floppy Disk add-on is a double sided, 160 track (80 per side), 5 1/4" monster! The ultimate in state-of-the-art 5 1/4" Floppy Disk technology, to 80+4 is seen by the TRS-80+ as two single sided disk drives, each with 80 tracks. Thus, in terms of capacity one 80+4 is equivalent to 4 1/2 standard Radio Shack drives — a savings of over 73% (not to mention diskettes!!). (With a double density converter, the available memory is huge!) The 80+4 is similar to the 80+2 in that it arrives configured as Drive 0 and any of the other three addresses (with the standard Radio Shack Cable) or as any of four drives (with the SS Standard Cable). The 80+4 INCLUDES TRAKS-PATCH on Diskette. (The plug board is also included.) Formatted data storage is 408K single density or 816K bytes double density.

SIRIUS 80+4\$624.95

All 80+ Series Floppy Disk add-ons operate a 5 milliseconds track-to-track access time (eight times faster than the SA 400) but are Expansion Interface Limited to 12 milli-seconds for the TRS-80+.

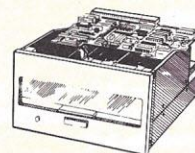
*TRS-80© Tandy Corp.

MPI 51/52 ... A Great Reliable Mini-Drive!

- Fast! 5ms track to track access
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- Reliable 1 1/2% Speed Stability
- Single/Double Density Operation
- Industry/ANSI Standard Interface

MPI 51
(Single Head, 40 tracks, 120K/240K bytes Single/Double Density**)\$259.95

MPI 52
(Dual Head, 70 tracks, (35/side), 218.8K/437.5K Single/Double Density**)\$349.95



MPI 91/92 ... NEW STATE-OF-THE-ART DISK DRIVE!

MPI 91
(Single Head, 80 tracks, 240K/480K Single/Double Density**)\$389.95

MPI 92
(Single Head, 160 tracks (80/side), 480K/960K Single/Double Density**)\$499.95

**Unformatted data storage

Introducing the Versatile, Low-Cost OMEGA Series Controller

As new technological advances bring down the cost of fast, reliable mass data storage, the need for an inexpensive, versatile controller have become greater and greater. To meet this need, SIRIUS SYSTEMS' OMEGA Series Controller was designed.

The SIRIUS OMEGA Series Controller Module utilizes an on-board microprocessor to mediate data transfer to a wide variety of peripherals from an equally wide variety of host computer systems. Up to four Winchester Hard Disks (8" or 14"), four 5 1/4" Floppy Disk Drives and/or up to eight 8" Floppy Disk Drives may be in use at one time. Host systems interfacing is accomplished via a parallel or a serial interface. With the addition of a Personality module, the OMEGA Series Controller Module is directly compatible with many popular computer systems (among them the TRS-80+, Apple, Heath, and others). Provision is made for the addition of a streaming tape drive, also.

SPECIFIC HARDWARE FEATURES INCLUDE:

- Control of up to twelve Floppy Disk Drives (eight 8" and/or four 5 1/4")
 - 8" and/or 5 1/4" Disk Drive Utilization
 - Single (FM) or Double (MFM) density data storage
 - Hard or Soft sector diskette usage
 - Utilization of "Quad" density (96 tpi) 8" or 5 1/4" Disk Drives
- Control of up to four WINCHESTER type PRIAM DISKOS Disk Drives
 - 8" or 14" may intermix on the same cable
 - Accommodates 8" and/or 14" drives of 5.3Mbytes to 154Mbytes
 - Ultra-Fast data transfers
- Extremely flexible host-controller interfacing

SPECIFIC SOFTWARE FEATURES INCLUDE:

- Dynamic format modifications via command words
- Extremely flexible format acceptance for unusual data storage formats
- Easily interfaces to standard operating systems (TRS-DOS, CP/M, etc)
- Operates in either get/put sector mode or data string mode
- Performance parameters may be changed by EPROM replacement or Dynamic Re-programming

Dedicated systems cards are also available on a limited basis for the STD-BUS and the S 100. These cards feature shared memory also (again, software selectable) in addition to the regular OMEGA Series Controller Module features. Consult SIRIUS SYSTEMS for current price and availability for the entire line of OMEGA Series Memory Units and Controllers. Dealer inquiries are invited.

SIRIUS SYSTEMS

7528 Oak Ridge Highway
Knoxville, Tennessee 37921

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We accept MC, VISA, AE, COD (requires Certified Check, Cashier's Check or Cash) and Checks (personal checks require 14 days to clear). **SHIPPING AND HANDLING: \$7.00 per Floppy Disk Drive or 80+ Module** ■ 5% for other items (any excess will be refunded) ■ **Foreign Orders** add 10% for Shipping & Handling. Payment in U.S. currency ■ Tennessee residents add 6% Sales Tax ■ **VOLUME DISCOUNTS AVAILABLE**

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	LIST	RAYGAM
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8" SOFT GEORGIA MAGNETICS

(While quantities last)

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Turn your 6502 Apple into Z-80 compatible 350.00 315.00

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CIRCLE 5

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CIRCLE 6

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WE WILL NOT BE UNDERSOLD

16K MEMORY UPGRADE KITS

for TRS-80*, Apple II, Sorcerer (specify)

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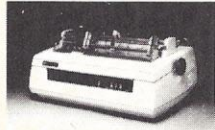
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\$314

More capacity than Radio Shack 35 Track (80 K Bytes) drives. Fully assembled and tested. Ready to plug-in and run the moment you receive it. Can be intermixed with each other and Radio Shack drive on same cable. TRS-80* compatible silver enclosure.

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Includes TRS-80* interface software, quick change print fonts, 55 cps, bidirectional, high resolution plotting, graphing, proportional spacing

\$2689

With Tractor Feed \$2889

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R.O. \$2890

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Same as Radio Shack line printer I

\$969

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9 x 7 matrix

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FOR TRS-80*

CCI-100 5 1/4", 40 Track (102K Bytes) for Model I \$314

CCI-200 5 1/4", 77 Track (197K Bytes) for Model I \$549

CCI-800 8" Drive for Model II (1/2 Meg Bytes) \$795

For Zenith Z89

CCI-189 5 1/4", 40 Track (102K Bytes) add-on drive \$394

Z-87 Dual 5 1/4" add-on drive system \$995

DISKETTES — Box of 10 (5 1/4") — with plastic library case \$24.95

8" double density for Model II (box of 10) \$36.49

COMPLETE SYSTEMS

TRS-80* LEVEL II-16K with keypad \$719

TRS-80* Expansion Interface \$269

ZENITH Z89, 48K all-in-one computer \$2595

ZENITH Z19 \$740

TELEVIDEO 912B \$745 920B \$769

ATARI 400 \$489 ATARI 800 \$799 TI 99/4 \$894

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Scrolling Modifications

Dear Editor:

In the article on "Scrolling" (PC, June 1980) I suggested (as an exercise) modifying the program to use the double-sized letters available on the TRS-80. Readers who tried it may have had trouble, because the PRINTing of the larger letters has to start at an even numbered location (Ref: Radio Shack Newsletter, June 1979, page 5).

Below is a modified program for double-sized letters. The changes are underlined.

Also, some interesting effects can be produced by dividing the message into two lines (using the down-arrow).

Roger B. Wilcox
Sunnyvale, CA

```
10 CLEAR 250
20 FOR L=1 TO 3 : PRINT CHR$(23)
30 PRINT "WHAT IS YOUR MESSAGE (LIMIT 31 LETTERS/SPACES)"
40 INPUT AS(L)
50 N=LEN(AS(L)): IF N>31 PRINT "MESSAGE TOO LONG": GOTO 30
60 NEXT L: CLS: PRINT CHR$(23)
70 FOR L=1 TO 3 : N=LEN(AS(L))
80 FOR X=574 TO 512-2*N STEP-2
90 IF X->574-2*N PRINT X, LEFT$(AS(L),(574-X)/2): GOTO 120
100 IF X<512 PRINT 512, RIGHT$(AS(L),N*(X-512)/2): GOTO 120
110 PRINT X, AS(L)
120 FOR Y=0 TO 30: NEXT Y
130 PRINT 512, CHR$(30)
140 NEXT X,L
```

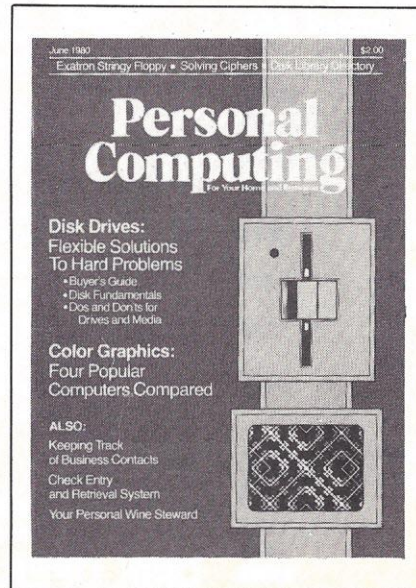
4K Robots

Sir or Madam:

In your June, 1979 issue, the program "Robots" is shown as an 8K program. The author, William Lappen, states that the program can be altered to fit into 4K by "searching through the location array instead of the screen block." I'm confused and bewildered as to the process of accomplishing this task. Any ideas?

M. Scott Everard
San Diego, CA

Author's note: The program listing in Figure 1 should run in a 4K Level II machine. You will notice that this program is a completely "stripped down" version (i.e., no instructions). Please refer to the June 1979 issue of *Personal Computing* for the instructions.



While it is possible to run the program on a 4K machine by "searching through the location array," I have found a much faster technique. Using this method, the program runs at about the same speed as the published version. The technique involves looking directly at what is displayed on the screen itself. (See line 990 for an example of this.)

— William Lappen

Figure 1

```
5 'ROBOTS--4K PROGRAM
10 CLEAR 20
20 DEFINT A,I
30 DIM A(25)
40 RANDOM
50 K=0
60 IF D>0 THEN D=D+2-INT(F/2): GOTO 90
70 INPUT "DIFFICULTY LEVEL ";D
80 IF D<1 OR D>25 GOTO 70
90 CLS
100 PRINT CHR$(23)
110 C=D
120 'DRAW ROOM
130 FOR I=4 TO 92: SET(I,2): NEXT I
140 FOR I=2 TO 45: SET(92,I): NEXT I
150 FOR I=92 TO 4 STEP -1: SET(I,45): NEXT I
160 FOR I=45 TO 3 STEP -1: SET(4,I): NEXT I
170 GOSUB 1300
180 A(0)=S
190 PRINT @ S, "!!!";
200 'FILL ROOM
210 FOR I=1 TO D
220 GOSUB 1300
230 PRINT @ S, "!!";
240 A(I)=S
250 NEXT I
260 FOR I=D+1 TO D*3
270 GOSUB 1300
280 PRINT @ S, "!!";
290 NEXT I
300 'A(0) = *
310 'A(1-D) = *
320 PRINT @ 180, "MOVES:";
330 PRINT @ 308, "1 2 3";
340 PRINT @ 372, "4 5 6";
350 PRINT @ 436, "7 8 9";
360 AS=INKEY$
370 V=D
380 PRINT @ 816, V: "LEFT ";
390 IF V=0 GOTO 1380
400 F=V
410 PRINT @ 624, "MOVE ?";
420 AS=INKEY$:IF AS="" GOTO 420
430 N=VAL(AS)
440 PRINT @ 632, N;
450 FOR I=1 TO 20
```

```
460 NEXT I
470 IF M<1 OR M>9 GOTO 410
480 PRINT @ 624, " ";
490 'MOVE *
500 X=0
510 Y=0
520 IF M=5 GOTO 680
530 IF M=1 OR M=4 OR M=7 THEN X=-1
540 IF M=3 OR M=6 OR M=9 THEN X=1
550 IF M=1 OR M=2 OR M=3 THEN Y=-1
560 IF M=7 OR M=8 OR M=9 THEN Y=1
570 S=A(0)+Y*64+X*2
580 'S = NEW LOCATION
590 A=INT(S/64+.001)*64
600 IF S-A<3 OR S-A>45 GOTO 410
610 A=INT(S/64+.001)
620 IF A<1 OR A>14 GOTO 410
630 'VALID MOVE
640 PRINT @ A(0), " ";
650 IF PEEK(15360+S)<>32 THEN X=-3: GOTO 1400
660 A(0)=S
670 PRINT @ A(0), "!!!";
680 'MOVE ROBOTS
690 V=0
700 I=0
710 I=I+1
720 IF A(I)<>0 AND PEEK(15360+A(I))
=37 GOTO 770
730 'ROBOT I INACTIVE
740 A(I)=A(C)
750 C=C-1
760 I=I-1
770 IF I<C GOTO 710
780 'C = ACTIVE ROBOTS
790 'X AND Y COMPONENTS
800 FOR I=1 TO C
810 IF A(I)=0 GOTO 1280
820 A1=A(0)-INT(A(0)/64+.001)*64
:B=A(I)-INT(A(I)/64+.001)*64
830 A1=A1-B
840 B=A(0)-A(I)
850 IF B<0 B=B+4
860 IF B>0 B=B-4
870 IF B<>0 G=B/ABS(B)
880 B=INT(ABS(B)/64+.001)*G
890 IF A1=0 THEN A1=.1
900 IF B=0 THEN B=.1
910 X=0
920 Y=0
930 IF ABS(A1/B)>4 X=A1/ABS(A1)
940 IF ABS(B/A1)>2 Y=B/ABS(B)
950 IF X=0 AND Y=0 THEN X=A1/ABS(A1)
:Y=B/ABS(B)
960 S=A(I)+Y*64+X*2
970 'S = NEW LOCATION
980 PRINT @ A(I), " ";
990 IF PEEK(15360+S)=37 GOTO 1100
1000 'MOVE ROBOT I
1010 IF PEEK(15360+S)=42 GOTO 1400
1020 IF PEEK(15360+S)<>43 GOTO 1250
1030 'HIT A WALL
1040 A(I)=0
1050 PRINT @ S, "!!";
1060 FOR K=1 TO 10
1070 NEXT K
1080 PRINT @ S, "!!";
1090 GOTO 1280
1100 'COLLISION
1110 A(I)=0
1120 V=V-1
1130 FOR J=1 TO 3
1140 PRINT @ S, "X";
1150 FOR K=1 TO 5
1160 NEXT K
1170 PRINT @ S, " ";
1180 FOR K=1 TO 5
1190 NEXT K
1200 NEXT J
1210 FOR J=1 TO C
1220 IF A(J)=S THEN A(J)=0: GOTO 1280
1230 NEXT J
1240 GOTO 1280
1250 PRINT @ S, "!!";
1260 A(I)=S
1270 V=V+1
1280 NEXT I
1290 GOTO 380
1300 'FILL ROOM
1310 A=14
1320 B=42
1330 S=RND(B)+2
1340 S=INT(S/2+.5)*2
1350 S=RND(A)*64+S
1360 IF PEEK(15360+S)<>32 GOTO 1310
1370 RETURN
1380 PRINT @ 984, "YOU WIN!!! ";
1390 GOTO 1490
1400 FOR I=1 TO 5: PRINT @ S, "!!!";
1410 FOR J=1 TO 5: NEXT J
1420 PRINT @ S, "X";
1430 FOR J=1 TO 5: NEXT J
1440 PRINT @ S, " ";
1450 FOR J=1 TO 5: NEXT J
1460 NEXT I
1470 IF X=-3 PRINT @ 970,
"SUICIDE ISN'T NOBLE! ";
1480 IF X<>-3 PRINT @ 980, "THEY GOT YOU! ";
1490 FOR J=1 TO 300: NEXT J
1500 GOTO 60
```


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A Symbol Explanation

Dear Editor:

I read with interest the article "Viewing Real Estate Investments" in the October 1979 issue.

Although I have been able to modify most programs to TRS-80 Basic, every once in a while there is a character I cannot decipher. One of these appears in lines 300, 940, 1050 and 1150. This is an inverted crescent.

I would appreciate any information you may have to offer as to the identification of the crescent symbol in North Star Basic.

Jack E. Willson
York, ME

Editor's note: This symbol, called a circumflex, stands for exponention. Thus, 5~3 means the cube of five. In TRS-80 Level II Basic, the equivalent symbol is the up arrow (↑). Other Basics use a carat (^) or a double asterisk (**) to stand for exponentiation.

Questions like these arise frequently when translating from one Basic to another. One handy reference you should have is *The BASIC Handbook* by David A. Lien. This book lists commands, statements, functions and operators from dozens of Basics, giving valuable information on converting from one Basic to another. The book costs \$14.95 plus \$1.35 postage and handling from CompuSoft Publishing, P.O. Box 19669, San Diego, CA 92119 — D. W.

Feedback on Feedback

Dear Editor:

The reason for this letter is to inform you of the unexpected response I've received from my letter you printed in the June issue (Feedback, "Read Carefully") — two long-distance phone calls (one from Florida, one from Arizona) and a letter from California, all advising how to rewire the DIP header on the Horizon serial interface and change one critical wire on the H14! It's obvious you have a large readership knowledgeable of North Star computers, and I thank you.

John R. Dye
Lacey, WA

Income Tax Deduction Worksheet in North Star

Dear Editor:

I have modified the "Income Tax Deduction Worksheet" program by W.B. Goldsmith, Jr., (PC, April 1980) to run in North Star Basic.

A listing and sample run are shown in Figure 2. In addition to making the necessary modifications for the han-

dling of alpha strings (lines 200, 1170 and 1320 are typical of these changes), I added two addition deductions, Medicine and Drugs and Health Insurance. I also modified the input section in lines 1300 to 1430 to provide a means to verify and, if necessary, correct an input line.

I have a Sol-20 with Dual Mini-Floppies and a Selectronic Printer. My revision of the program has the hard-copy routine for my system in lines 250 and 1440.

George E. Pond
Gardena, CA

Figure 2

```

10 REM INCOME TAX WORKSHEET
20 REM PERSONAL COMPUTING APRIL 1980 PAGE 24
30 TAB(5),"TAX DEDUCTION WORK SHEET"!
40 LINE #2 70LINE70
50 DIM P$(5000),C$(500),Y$(25),N(100),A(100)
60 INPUT "PERIOD COVERED ",A$
70 "ENTER CHECK NUMBER, PAYEE,"
80 "CATEGORY, AND AMOUNT."!
90 TAB(3),"CATEGORIES ARE:"
100 TAB(6),"D MEDICINE & DRUGS"
110 TAB(6),"H HEALTH INSURANCE"
120 TAB(6),"M MEDICAL"
130 TAB(6),"T TAKES"
140 TAB(6),"I INTEREST"
150 TAB(6),"C CONTRIBUTIONS"
160 TAB(6),"E EMPLOYEE BUSINESS EXP."
170 TAB(6),"O OTHER"
180 !
190 INPUT "ENTER NUMBER OF ENTRIES TO BE MADE ",X
200 FOR J=1 TO X:J*31-30L=J*2-1
210 GOSUB 1320REM DATA INPUT
220 IF N(J)=0 THEN EXIT
230 NEXT J
240 ! "THAT'S ALL FOR THIS TIME!"
250 TAB(10),"HARD COPY?"GOSUB 1480
260 !#Z1#ZTAB(20),A$, "TAX DEDUCTION WORKSHEET"
270 D=0H=0M=0T=0I=0C=0R=0O=0
280 !#I#ZGOSUB 1210
290 !#I#ZTAB(15),"MEDICINES & DRUGS"!#Z
300 FOR J=1 TO X:J*31-30L=J*2-1
310 IF C$(L,L)<>"D" THEN 340
320 D=D+A(J)
330 GOSUB 1170
340 NEXT J
350 A=D
360 Y$="MEDICINE & DRUGS"GOSUB 1260
370 !#Z1#ZTAB(15),"HEALTH INSURANCE"!#Z
380 FOR J=1 TO X:J*31-30L=J*2-1
390 IF C$(L,L)<>"H" THEN 420
400 H=H+A(J)
410 GOSUB 1170
420 NEXT J
430 A=H
440 Y$="HEALTH INSURANCE"GOSUB 1260
450 !#Z1#ZTAB(15),"MEDICAL EXPENSES"
460 !#Z
470 FOR J=1 TO X:J*31-30L=J*2-1
480 IF C$(L,L)<>"M" THEN 510
490 M=M+A(J)
500 GOSUB 1170
510 NEXT J
520 A=M
530 Y$="MEDICAL EXPENSES"GOSUB 1260
540 !
550 !#Z1#ZTAB(15),"TAX EXPENSES"
560 !
570 FOR J=1 TO X:J*31-30L=J*2-1
580 IF C$(L,L)<>"T" THEN 610
590 T=T+A(J)
600 GOSUB 1170
610 NEXT J
620 A=T
630 Y$="TAX EXPENSES"GOSUB 1260
640 !
650 !#Z1#ZTAB(15),"INTEREST EXPENSE"
660 !
670 FOR J=1 TO X:J*31-30L=J*2-1
680 IF C$(L,L)<>"I" THEN 710
690 I=I+A(J)
700 GOSUB 1170
710 NEXT J
720 A=I
730 Y$="INTEREST EXPENSES"GOSUB 1260
740 !
750 !#Z1#ZTAB(15),"CONTRIBUTIONS"
760 !
770 FOR J=1 TO X:J*31-30L=J*2-1
780 IF C$(L,L)<>"C" THEN 810
790 C=C+A(J)
800 GOSUB 1170
810 NEXT J
820 A=C
830 Y$="CONTRIBUTIONS"GOSUB 1260
840 !
850 !#Z1#ZTAB(15),"EMPLOYEE BUSINESS EXPENSE"
860 !
870 FOR J=1 TO X:J*31-30L=J*2-1
880 IF C$(L,L)<>"E" THEN 910
890 E=E+A(J)
900 GOSUB 1170
910 NEXT J
920 A=E
930 Y$="EMPLOYEE BUSINESS EXPENSE"GOSUB 1260
940 !
950 !#Z1#ZTAB(15),"OTHER EXPENSE"
960 FOR J=1 TO X:J*31-30L=J*2-1
970 IF C$(L,L)<>"O" THEN 1070
980 IF C$(L,L)<>"H" THEN 1070
990 IF C$(L,L)<>"M" THEN 1070
1000 IF C$(L,L)<>"T" THEN 1070
1010 IF C$(L,L)<>"I" THEN 1070
1020 IF C$(L,L)<>"C" THEN 1070
1030 IF C$(L,L)<>"E" THEN 1070
1040 IF N(J)=0 THEN 1070
1050 O=O+A(J)
1060 GOSUB 1170
1070 NEXT J
1080 A=O
1090 Y$="OTHER EXPENSE"GOSUB 1260
1100 !
1110 CHR$(11)
1120 INPUT "ANOTHER COPY? ",R$
1130 A(J)=0Z=0K=0L=0
1140 IF R$(1,1)="Y" THEN 250
1150 REM THAT'S ALL
1160 END
1170 REM PRINT LINE SUBROUTINE *****
1180 !#Z#N(J),TAB(8),P$(K,K+29),
1190 !#ZTAB(55),%$C10F2,A(J)
1200 RETURN
1210 REM PRINTR HEADER ROUTINE *****
1220 !#Z"CK NR",
1230 !#ZTAB(8),"PAYEE (REMARKS)",
1240 !#ZTAB(58),"AMOUNT"
1250 RETURN
1260 REM PRINT TOTAL SUBROUTINE *****
1270 !#ZTAB(56),"-----"
1280 !#ZTAB(5),"TOTAL ",Y$,TAB(55),%$C10F2,A
1290 IF Z=2 THEN 1310
1300 INPUT "*****CONT.? ***** ",R$
1310 RETURN
1320 REM INPUT DATA
1330 P$=O
1340 INPUT "CHECK NUMBER: ",N(J)
1350 IF P$=1 THEN 1430
1360 INPUT "PAYEE: ",P$(K,K+29)
1370 IF P$=1 THEN 1430
1380 INPUT "CATEGORY: (D,H,M,T,I,C,E, OR O) ",C$(L,L)
1390 IF P$=1 THEN 1430
1400 INPUT "AMOUNT: ",A(J)
1410 IF P$=1 THEN 1430
1420 !
1430 INPUT "IS DATA CORRECT? ",Z$
1440 IF Z$(1,1)="Y" THEN 1470
1450 INPUT "WHICH LINE IS WRONG? ",O1P$=1
1460 ON O1 GOTO 1340,1360,1380,1400
1470 RETURN
1480 Z$=INCHR$(O1)P$
1490 IF Z$="Y" THEN Z=2 ELSE Z=0
1500 RETURN

```


Figure 3

```

2  REM PROGRAM BY DWIGHT WHEELER (PERSONAL COMPUTING, FEB. 1980)
4  REM ADAPTED BY AL DE LA LASTRA FOR EASIER CONTROL OF DIRECTION
6  REM SAVE ROUTINE HAS BEEN ADDED AT 3000
7  REM TO USE IT PRESS "S", HIT 'HOME' THEN HIT 23 'RETURNS'
8  REM THEN SAVE AS A PROGRAM. TO PRINT PICTURE RUN 4000
9  PRINT" (CLR)↓↓↓↓↓"
10 A=4000: REM PART OF SAVE ROUTINE
15 PRINT SPC(7) " MECHANICAL PAINTBRUSH 2.0" :PRINT:PRINT
20 PRINT" WHAT CHARACTER SHOULD WE USE" ;
30 INPUT B$
35 PRINT" (CLR)↓↓↓↓↓"
40 PRINT" STARTING AT THE CENTER, THE CURSOR
41 PRINT" WILL TRACE YOUR PICTURE FROM YOUR
42 PRINT" DIRECTIONS ENTERED ON THE NUMERIC PAD" : PRINT
43 PRINT,"      7 8 9
44 PRINT,"      ↖ ↑ ↗
45 PRINT,"      4 - 6
46 PRINT,"      ↙ ↓ ↘
47 PRINT,"      1 2 3 " :PRINT
48 PRINT," 0 = ERASE" : PRINT," 5 = PRINT"
49 PRINT," . = CHANGE CHARACTER"
50 PRINT," S = SAVE PICTURE
52 PRINT: PRINT" READY TO START? (Y/N)" ;
55 GET Q$
57 IF Q$ = "Y" THEN 90
60 IF Q$ = "N" THEN 999
70 GO TO 55
90 PRINT" (CLR)" ; SPC(19)" ↓↓↓↓↓↓↓↓↓↓↓↓ " B$;
100 GET A$
110 IF A$ = "1" THEN PRINT" ← ↙ " B$;GOTO 100
115 IF A$ = "2" THEN PRINT" ← ↓ " B$;GOTO 100
120 IF A$ = "3" THEN PRINT" ← ↘ " B$;GOTO 100
125 IF A$ = "4" THEN PRINT" ← ↖ " B$;GOTO 100
127 IF A$ = "7" THEN PRINT" ← ↗ " B$;GOTO 100
128 IF A$ = "8" THEN PRINT" ← ↑ " B$;GOTO 100
129 IF A$ = "9" THEN PRINT" ← ↘ " B$;GOTO 100
130 IF A$ = "6" THEN PRINT B$; GOTO 100
141 IF A$ = "0" THEN 250
142 IF A$ = "." THEN 2000
143 IF A$ = "S" THEN 3000
150 GOTO 100
250 PRINT" ← " ;
260 GET E$
261 IF E$ = "1" THEN PRINT" ← ↙ (SP)"; GOTO 260
262 IF E$ = "2" THEN PRINT" ← ↓ (SP)"; GOTO 260
263 IF E$ = "3" THEN PRINT" ← ↘ (SP)"; GOTO 260
264 IF E$ = "4" THEN PRINT" ← ↖ (SP)"; GOTO 260
265 IF E$ = "7" THEN PRINT" ← ↗ (SP)"; GOTO 260
266 IF E$ = "8" THEN PRINT" ← ↑ (SP)"; GOTO 260
267 IF E$ = "9" THEN PRINT" ← ↘ (SP)"; GOTO 260
268 IF E$ = "6" THEN PRINT" (SP)"; GOTO 260
269 IF E$ = "5" THEN PRINT" ← " B$; GOTO 100
270 IF E$ = "S" THEN 3000
280 IF E$ = "." THEN 2000
400 GOTO 260

999 PRINT: PRINT: PRINT" NOT AN ARTIST?...TOO BAD!"
1000 END

2000 GET B$
2010 IF B$ <> " " THEN PRINT" ← " B$; GOTO 100 (" " IS A NULL)
2020 GOTO 2000

3000 REM ROUTINE TO SAVE PICTURE
3005 PRINT" (HOME)"
3010 FOR I = A TO A + 210 STEP 10
3020 PRINT "?" CHR$(34) (THIS INSERTS QUOTATION MARKS)
3030 NEXT I
3035 PRINT" END ↑"
3040 A = A + 250
3500 END

(THE SAVED PICTURE WILL START WITH LINE NUMBER 4000.)

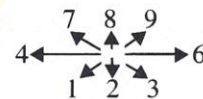
```

New Paintbrush Strokes

Dear Editor:

After reading Dwight Wheeler's article, "Mechanical Paintbrush (PC, February 1980) — which I enjoyed — it appeared that this pleasant little program was a good candidate for some polishing.

I have modified the program to use the numeric pad to indicate directions as follows:



Also: 0 = ERASE
5 = PRINT
. = CHANGE CHARACTER
S = SAVE ROUTINE

The SAVE ROUTINE (at 3000) inserts line numbers 4000 through 4220 at the left of the screen. Hitting Home and then hitting 23 "Returns" writes the picture into the end of the program as a sequence of print statements.

Unfortunately, only 23 lines can be saved with this routine and the picture must start at least 10 spaces from the left margin and one space from the right margin.

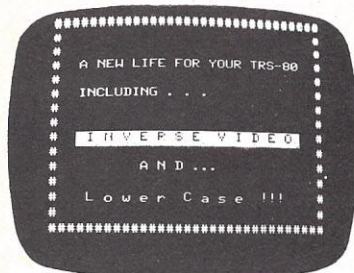
Al de la Lastra
Bethpage, NY

Author's note: My thanks to Al de la Lastra for his interest in my program. I ran the cassette Mr. de la Lastra sent. (See Figure 3 for listing.) His version is obviously an improvement and does afford a method of saving the drawings. But I think it is necessary to change the value of A in line 10 before running each time. Otherwise, the way the program sits (line 3040 notwithstanding) the new "save" wipes out the old. However, if you do change the value of A by adding 250 each time, the new drawing will be added to the end and can be displayed by writing RUN 4250, RUN 4500, and so forth.

The program uses the numeric pad for directions, which I have found is rather standard and very reasonable for direction movements. I don't know why I didn't think of it, but it does improve the ease of performance.

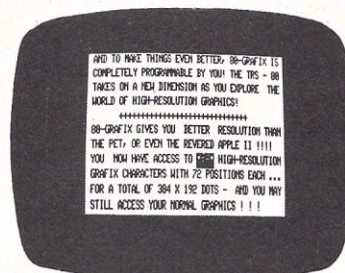
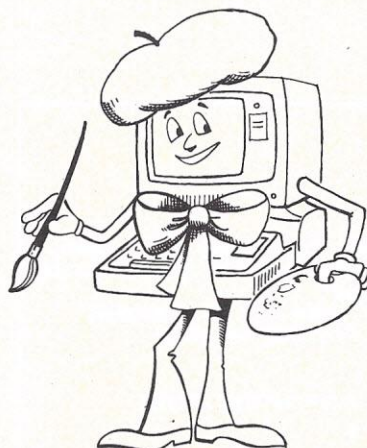
—Dwight Wheeler

FROM **PROGRAMMA** HI-RESOLUTION GRAPHICS FOR THE TRS-80®



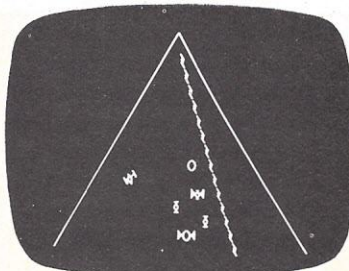
LOWER CASE

The 80-GRAFIX board includes two sets of lower case characters at no additional cost.



INVERSE VIDEO

The 80-GRAFIX board allows you to do inverse video to high-light your screen displays.



DEMONSTRATION PROGRAMS

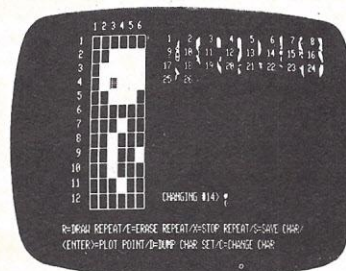
The 80-GRAFIX board is supplied with a Character Generator software and several demonstration programs.

FINALLY, AT LAST...

HI-RESOLUTION GRAPHICS is available for your TRS-80 computer system. The 80-GRAFIX board from PROGRAMMA International, Inc. gives your TRS-80 high resolution capability that is greater than the Commodore CBM/PET or even the revered APPLE II.

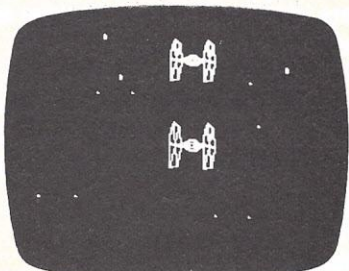
80-GRAFIX gives the TRS-80 an effective screen of 384X192 pixels, versus the normal 127X192 for the TRS-80, 80X50 for the CBM/PET, or the 280X192 of an APPLE II. As an added feature, 80-GRAFIX offers you lower case characters at no additional cost. Of course, you can also create your own set of up to 64 original characters using the supplied Character Generator software.

The 80-GRAFIX board is simple to install (note that this voids your Radio Shack warranty), and programming is done through BASIC. 80-GRAFIX opens up a whole new realm of software development and excitement never dreamed of for the TRS-80!



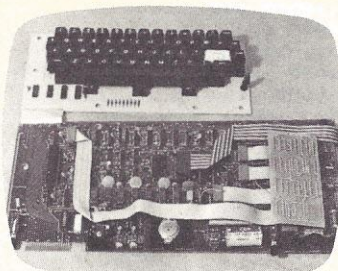
CHARACTER GENERATOR

The supplied character generator software allows you to create your own character set of up to 64 original characters.



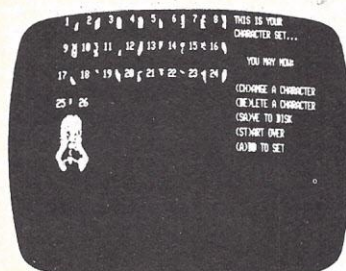
REAL-TIME GRAPHIC GAMES

With the 80-GRAFIX board you can write exciting real-time games using BASIC.



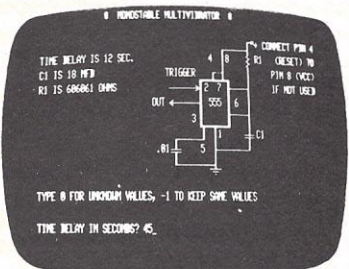
EASY INSTALLATION

The 80-GRAFIX board is simple to install and fits inside the TRS-80 case.



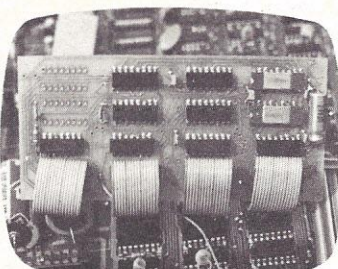
GRAPHICS GALORE

The 80-GRAFIX board and the supplied Character Generator allow you to become an artist.



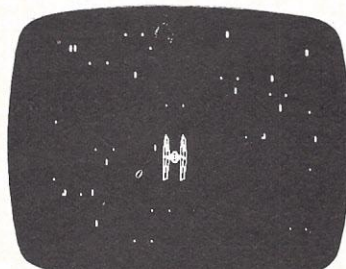
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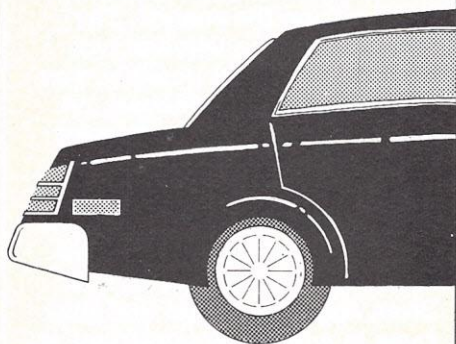
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Apple Helps Businessman Drive in Style

William Kelly, multi-business owner, has equipped his limousine with all the conveniences of his office and home to reduce non-productive commuting time. The car is packed with everything from a sink with running water to an Apple computer.

The Apple microcomputer system features 48K RAM, floppy disk storage capacity of 232K,



16 color generation, high resolution graphics, and three languages in ROM: Assembly, Integer Basic and Floating Basic. Also included is a custom built keyboard enclosure and sound synthesis capability in the 6502 microprocessor based system.

The Berliner Computer Center, a division of Berliner Electronics located in New York, installed the data processing center in Kelly's car. Mike Dinoff designed the installation and Al DiBlasi wrote the custom software package.

DiBlasi, head of Berliner's software department, put together a package consisting of two different types of database management systems to allow Kelly flexibility within the system, a copy of a phone list system and several games including chess and backgammon. "We made the software so Kelly wouldn't have to swap disks; he'd have everything on line and wouldn't have to start playing with disks in the car," said Bob Berliner, president

of Berliner Electronics.

Although all the software is menu-driven, making it very easy for Kelly to operate the computer, he is learning programming.

The computer has two disk drives each holding 116K bytes for a total of 232K. They are both mounted remotely along with the computer itself. "We wanted to make sure he had enough storage capacity to do what he wanted to do without necessitating swapping of disks while he was in motion," Berliner said.

Asked why they chose an Apple computer for the limo, Berliner said, "It is the most versatile computer available on the market today. We also chose it because of the experience we have had with the Apple as far as reliability goes and its ability to work in any sort of environment that we've ever put it into."

The graphics capabilities of the Apple are used for plotting business graphs and playing games. Kelly's chess and backgammon programs both use the high resolution graphics of the computer.

The sound synthesizer adds realistic noises to the games. It also produces warning signals within the programs for error messages and incorrect entry notification.

The custom-built 1980 Cadillac Stretched Limousine came equipped from the builder with a sink with running water, soda dispenser, ice box, color TV and bar.

"We started by ripping apart the whole back end of the car and much of the front end to redo all the wiring in the car," Berliner said. "We had to make sure that the existing wiring would be shielded properly so it wouldn't affect the computer with radio frequency interference."

Berliner also equipped the car

with a custom designed Alpine stereo system featuring ten speakers, AM-FM stereo/cassette, 200 watts of power, digital time delays, qualizer/bi-amp, master/slave override controls and a digital variamp signal processor. Front and rear built-in radar detection units were also added.



A remote control starting system allows Kelly to start the car and turn the lights on from up to a quarter mile away. This feature is used to warm up or cool off the limo and acts as a security device to provide remote control detonation in the event an explosive has been wired to the car's ignition or light system. There are also dual burglar alarm systems: a keyless hard-wired audible alarm and a microwave silent alarm with automatic antenna activation.

Kelly requested an Audiovox 40 channel remote controlled CB radio with automatic electric antenna and a video tape recorder and player allowing him to view previously taped business seminars or TV shows. The recorder and player are remote-controlled from the rear of the car. There is also a color video camera which Kelly can use in the car or as a portable unit to record important business meetings or events. Kelly can review the tapes immediately using the built-in color monitor.

Another feature is a 120 volt A/C inverter allowing Kelly to use small appliances such as a shaver or electric toothbrush. There is a voltmeter to monitor

the exact voltage.

According to Berliner, Kelly spends several hours a day in the car commuting between his home and his three businesses:

an electronics supply company, a roofing company and a limousine company.

— by *Elli Holman*

International Crisis Forecasting

Will war break out between Israel and Syria? How will the internal conflicts in Zimbabwe progress? These questions can be answered — in the form of percentages and level of tension ratings — with international crisis forecasting. In the past, experts and analysts did the forecasting by studying situations and making predictions on their own. Now computers can help provide actual percentages for forecasting probabilities.

Dr. George T. Duncan, associate professor of statistics at Carnegie-Mellon University in Pennsylvania, has collaborated with Dr. Brian Job, assistant professor of political science at the University of Minnesota, to develop an International Policy Forecasting System that produces a 30-day forecast of the probability of changes in a country's politics. The project began three and a half years ago and has been funded by the Advanced Research Projects Agency of the Department of Defense.

"The basic idea of the system is to put an international relations analyst who has substantial knowledge of a particular international phenomenon together with the computer," said Dr. Duncan. "The power of the analyst can be extended through the computational abilities of the computer and the machine also imposes consistency and coherency on the analysts.

"Our basic aim was to develop a methodology whereby analysts were encouraged to face up to uncertainties that exist in the international relations area. They were to confront the uncertainties directly and look at all possible alternatives that might prevail and assess the likelihood of each one of those outcomes prevailing," said Dr. Duncan.

The computer uses the Markov Renewal Model, which is built into the machine, to produce the forecasting results, said Duncan. Andrey Andreyvich Markov worked with probability theory, resulting in the Markov chain, where there is a sequence of random events in which the probability of each event depends upon the outcome of previous trials.

The forecasting system analyzes the level of hostility in a given situation and produces a rating of tension. The five levels are: 1 — no tension; 2 — minor tension; 3 — major tension; 4 — overt tension; 5 — war declared. A forecast is given for 30 days, with each day rated from one to five.

The system is able to specify for each day for 30 days what the probability is of being in any one of those five levels of tension.

"A large part of the work has to do with developing a proper conceptual model for looking at the particular situation and making sure that the different state conditions are sufficiently well-defined so that different analysts would agree on what is meant by those particular words," said Dr. Duncan.

The computer asks the analyst questions about the phenomenon under consideration, then the computer replies with feedback about the implications of the analyst's judgments. The analyst has the opportunity to revise initial judgments.

"The computer, through the model that exists in the computer, is able to generate forecasts that are consistent with the model and the answers to the questions that were placed to the analyst," said Dr. Duncan. "So, the model can answer some fairly sophisticated kinds of questions, ones that an analyst

would have a hard time answering in any coherent, consistent way."

So far, the crisis forecasting system has analyzed the situation between Israel and Syria, and the internal problems in Zimbabwe. Dr. Duncan said these situations were chosen because they are distinct in terms of conceptual demand put on the analyst. The Israel-Syria crisis involves two antagonistic actors possibly moving toward war. Zimbabwe, on the other hand, is a single actor suffering internal turmoil.

The two analysts working on the Zimbabwe situation are a retired Navy captain with a Ph.D. in international relations, and Brian Job. "We found that they came in with fairly consistent assessments of the situation. Of course they differed somewhat because they each had access to different sources of information and their perceptions are different. But those perceptions — the daily monitorings — were fed into the computer and revised forecasts were constructed using the methodology we developed (the idea of revising beliefs on the basis of data to come up with revised assessments)."

Forecasts produced by the system are compared with traditional methods to check for consistency, whether they make sense and whether they add anything new to what's been done already.

As an expansion of the concept of forecasting probabilities, Dr. Duncan and his colleagues would like to be able to look at the impact of various alternative policies — if one course of action was carried out, what changes would it make in the system? This project extension is on the drawing boards.

— by *Marjorie Morse*

Help for the Handicapped

Nowhere are the benefits of learning with personal computers more dramatic than with the handicapped, whose physical limitations have been a barrier to an education.

The small computer, coupled with an assortment of specially designed input and output techniques, can become a "voice" for those who have none, "eyes" for those who are sightless, and "ears" for the deaf.

In many cases the design of these special learning aids is being accomplished by individuals who feel the need personally — they are relatives or friends of handicapped people.

Three such individuals — all working independently with cerebral palsy victims — are John Giem, Tim Scully and John Watkins. The experiences of these three California men serve to illustrate the flexibility of the personal computer and, hopefully, will inspire others to envision new ways of helping the handicapped to communicate and learn.

John Giem is an engineer whose son, Chris, has cerebral palsy. Out of his son's needs, Giem envisioned a system in which a "joy stick" could be used to control the interface with a computer, thus eliminating the need for a keyboard, often one of the greatest obstacles for the handicapped.

Giem enlisted the aid of an occupational therapist and a counsellor who trains handicapped people to be computer programmers. By pooling their ideas and expertise, they have designed a microcomputer system that is flexible, reliable, and inexpensive enough to be offered to the entire physically handicapped community.

The system involves an easily-manuevered stick control which lets the user build sentences on a TV screen through simple movements either to the right or left.

In the case of his son, Giem said, this new ability has removed the frustration of trying to con-

trol the movements of a pencil when writing.

The developers of the system said the same basic approach will work for the blind if an audible feedback is added to the computer so that the user can build sentences by sound.

Further refinements will make it possible for persons with movement in only one direction to use a one-movement joy stick, for those who are almost completely paralyzed to operate the system with only their tongue, or for quadraplegics to be able to use nothing but voice commands to control the computer.

Indeed, making this system possible for a wide range of handicapped people is the primary objective of John Giem and his co-workers.

At a future point, they hope to be able to do away with the menu of characters that must now be shown on the screen for the construction of sentences.

"What I envision," said Giem, "is that when a person wants to write a book report, the screen will be taken up by complete pages of sentences rather than just a sentence at a time. The person can then edit and format each page in its entirety and store

it on a floppy disk for retrieval at any time.

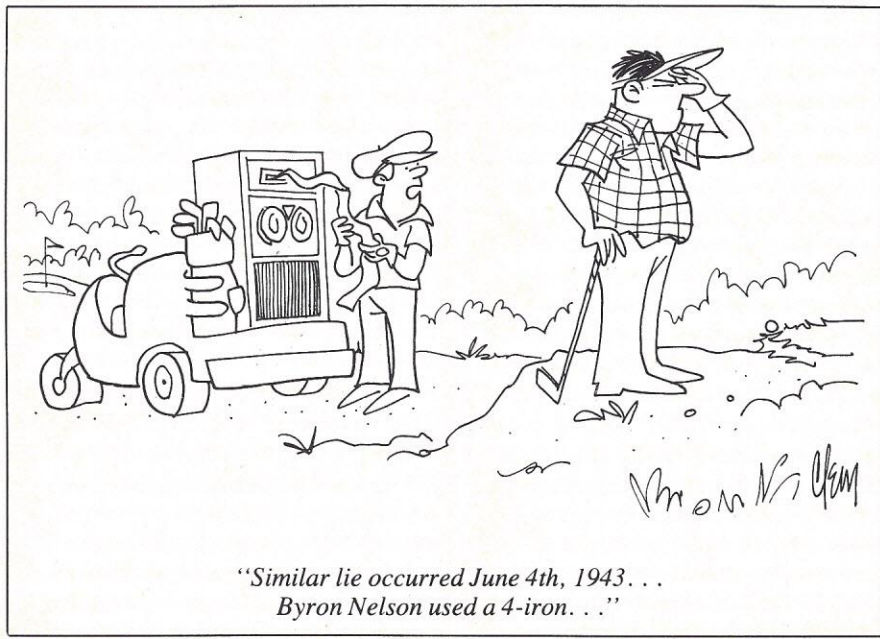
"The system, complete with a two-movement joy stick and audible feedback is almost complete now, and we hope to have it available to the handicapped community by next year."

John Watkins, a computer salesman whose daughter is a victim of cerebral palsy, also was convinced that a personal computer was the answer to her problems in communicating and learning, but encountered the very real fact of her inability to use a standard keyboard.

Watkins' solution was to custom design an oversized touch sensitive keyboard, measuring 15" x 18", with "keys" which are really flat surfaces measuring 1" square and with 1" of spacing between them in all directions.

"This allows a large target area which makes it possible for the handicapped person with limited finger dexterity to be able to touch the appropriate area," Watkins said. "Using the prototype I've built, my daughter is now able to produce letters and numbers on a TV screen with just the slightest touch."

Watkins conceived the keyboard with virtually no idea as to



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how it could be produced until he read about a new California electronics company, TASA, Inc., which had developed a low-cost flat-surface keyboard using all solid state circuitry. He took his idea to the company, which is now in the process of implementing the design.

The results with his own daughter have been impressive, he said. "The biggest thrill was watching her face the first time she spelled out on the screen 'My name is Dawn.' " Watkins is now making plans to market the system for other handicapped users, either as a complete package with a microcomputer or with a TV interface which makes it usable with any microcomputer.

"Using a two-channel tape recorder, a personal computer and educational tapes, I've been able to provide Dawn with an expandable learning center and a means to store homework, games, stories, and so on. I would like to see the parents of other handicapped children have the same opportunity," Watkins said.

Tim Scully is perhaps the most publicized of the three men

covered in this article. His work, like that of John Giem, has been detailed at the West Coast Computer Faire and Scully has attracted added attention because he is doing his design work from inside the walls of a Federal prison, where he is serving out a drug-related sentence.

The cerebral palsy victim with whom Scully worked was a friend in her twenties who can't talk or use her hands and has only limited control over one knee. When he met her in 1976, she was communicating via an electric word wheel to help her in "talking," since she was able to read and understand speech. She was able to trigger the word wheel with her knee and stop it when it rotated to the letter or phrase she wanted.

Scully designed a system incorporating a personal computer and video display to replace the word wheel, providing the girl, Robin, with a greater vocabulary stored in the computer memory.

The system, which has been installed on Robin's wheelchair, is operated with a kneeswitch which allows her to select from

the menu of items on the TV display.

According to Scully, the system has opened new horizons for Robin, who had lived her 20-plus years without the ability to do things as simple as asking for a drink of water.

In the case of all three of these special projects involving cerebral palsy victims, there clearly are potential applications to help other handicapped persons.

Similar efforts are underway worldwide either by concerned individuals or organizations, all aimed at providing help to the handicapped, regardless of what that handicap might be, in communicating with the world around them.

And with that expanded communications ability, the personal computer can provide new learning opportunities for the handicapped far beyond their present limitations.

— by Pamela Jung

Reprinted from Apple Magazine, Vol. 1, No. 1, "Computers in Education" Courtesy of Apple Computer Inc.

Medical Information Systems Entering Physicians Office

U.S. sales of computerized medical information systems (MIS) will increase dramatically, reaching sales of \$1.8 billion in 1984, according to a five-year analysis of the MIS industry released by Creative Strategies International (CSI), a California-based market research and consulting firm.

A significant number of these new sales will be made not to the traditional, large end users, like hospitals, but to two increasingly important market segments — independently practicing physicians and small medical groups.

As paperwork from insurance forms, inter-office accounting, patient data and in-office lab tests snowballs, office-based physicians who currently keep manual records are turning to comput-

erized medical information systems to help tame the blizzard. Systems that were financially out of reach for even large group practices five years ago are now an affordable reality for smaller groups (e.g., four doctors and under) and even solo practitioners. For a cost of under \$20,000, the small office-based practice can purchase a 64K central processing unit, a display terminal, a dual floppy disk system, a daisy-wheel printer and a medical software package, said CSI.

While hospitals will still account for a large majority of the MIS market, their total market share will decrease by 1984 as small medical group and nursing home shares increase dramatically, showing compound annual

growth rates of 24.2% and 32.9% respectively.

Smaller offices and clinics which currently utilize MIS are heavily dependent upon shared services, including service bureaus, which relieve them of the expense of buying in-house mainframe computers — but which can cater to their individual needs on a limited basis. For the most part, in-house mainframes are marketed to large group practices and clinics that have problems, and budgets, similar in scope to hospitals. In-house mini-computers allow individual firms to tailor their data management requirements more closely than the necessarily general applications shared services offer to a multitude of clients.

RANDOM ACCESS

Of the 70 American companies currently manufacturing MIS, six account for 68% of total U.S. revenues. For smaller companies, which compete mostly for the well-established accounting and financial management systems, the struggle to survive will hinge on the relative sophistication of their application software, their willingness to focus on smaller physician-group offices, and their ability to satisfactorily service their clients.

Creative Strategies new study, *Medical Information Systems*, provides an analysis of the industry from supplier to buyer. Fore-

casts to 1984 are provided by end-user segment (hospitals, nursing homes, dentists and medical clinics) and by application segment (accounting and financial management systems, admission-discharge-transfer, clinical laboratories, pharmacies, radiology, medical records, order entry applications and other applications). *Medical Information Systems*, analyzes the medical information systems industry through 1984.

For further information contact Creative Strategies International, 4340 Stevens Creek Blvd., Suite 275, San Jose, CA 95129; (408) 249-7550.

Speech Recognition System Answers Calls for Company Shareholders

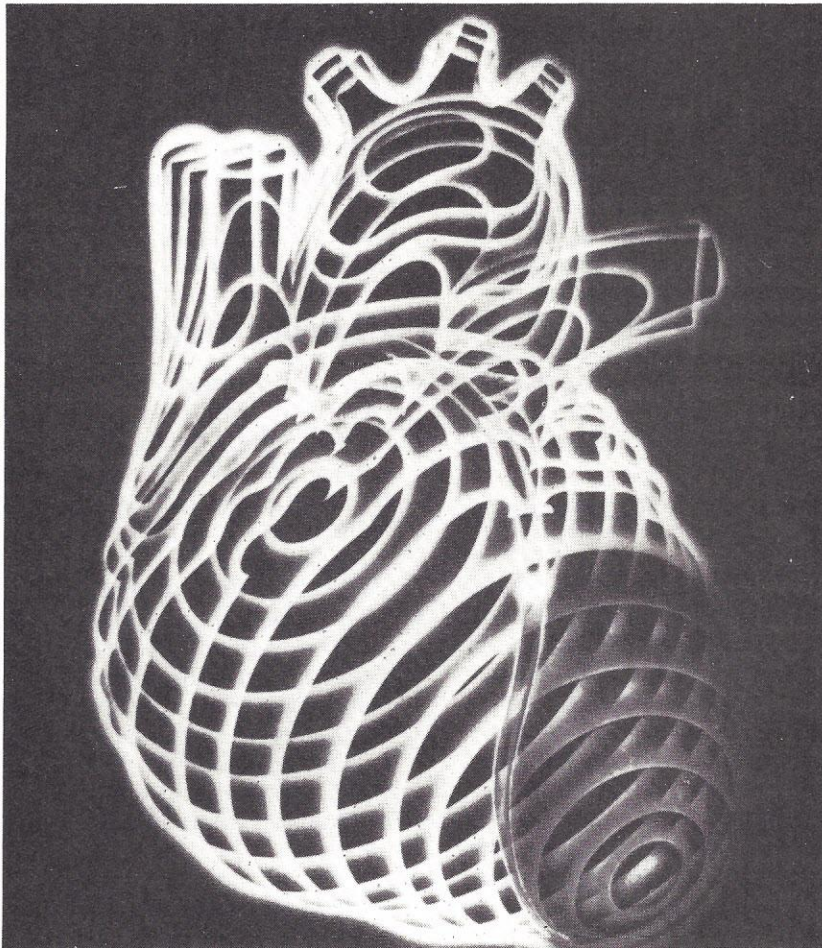
Fidelity Management Research is using a computerized speech recognition/response system to provide shareholders the latest yields and prices on the company's group funds. The system, called Fidelity Information Phone, was developed by Dialog Systems, Inc. It allows a shareholder to call any time of the day or night, seven days a week, and obtain the yields and prices of one or more funds.

"In the past, professional service representatives had to handle each call," says Roger Servison, vice president of marketing. Now Fidelity Information Phone handles about 2500 routine calls a day, out of the 15,000 calls received daily from shareholders and potential investors. Because the Fidelity Information Phone handles the routine calls, the professional staff can spend its time answering more complex questions.

To use the service a shareholder dials an 800 number and Dialog's voice response unit answers, "Fidelity Information Phone, the fund number please." The shareholder says the valid fund number and the system responds with the price of (if appropriate) and the yield for the requested fund. A shareholder may request information on up to five funds per call. If shareholders desire more information, they can request the aid of a "live" professional representative.

"The response to Fidelity Information Phone has been very positive," says Servison. "Our service is easy to use — since the Dialog System recognizes speech, a shareholder doesn't have to own a push button telephone."

Dialog Systems is located at 32 Locust St., Belmont, MA 02178; (617) 489-2830.



A simulated computer graphic showing the heart undergoing anginal block (the glowing circle, center right) helped E. R. Squibb & Sons, Inc., introduce a new cardiovascular medication called Corgard requiring only once-a-day dosage for the treatment of either angina pectoris or hypertension (high blood pressure). Angina pectoris is typically an attack which can range from mild discomfort to crushing vise-like pain. Although not associated with pain, hypertension is a "silent killer" and a primary factor in causing stroke, hardening of the arteries, kidney disease and in increasing the danger of heart disease.

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☆☆☆ Announcements ☆☆☆

North Star Group

The newly-formed International North Star Users Association is officially recognized by North Star to provide liaison, feedback and fixes for users of North Star's computers or disk operating systems running on other computers.

The international association will not compete with already established local users groups but hopes to act as a link between these groups, individual North Star computerists, and the Berkley company, said Association officials.

The group's charter calls for it to act as a source of information for new as well as advanced North Star users; publish a quarterly newsletter for members including application and programming techniques; maintain and distribute a users public domain software library; provide a means of affiliation with other users groups; and act as an independent representative to make users needs known to North Star Computers, Inc.

Annual membership is open to everyone. Yearly dues are \$15 which includes a subscription to the newsletter as well as access to all the groups software and hardware documentation. For more information contact INSUA, 131 Highland Ave., Vacaville, CA 95688; (707) 448-9055.

Three Shows

Three business and home computer shows for end-users will be held in Washington D.C., Chicago and Boston. The shows, produced by National Computer Shows, feature small and medium-sized business systems, scientific and engineering computers, micro-computers and electro-technology.

The Middle-Atlantic Business & Home Computer Show is scheduled for September 18-21, 1980, at the D.C. Armory/Starplex, Washington, D.C. The Mid-

West Business & Home Computer Show will be presented at McCormick Place, Chicago, IL, October 16-19, 1980. The Northeast Business & Home Computer Show will be held at Hynes Auditorium/Prudential, Boston, MA, November 20-23, 1980.

Show hours are Thursday through Saturday, 11 a.m. to 9 p.m. and Sunday 11 a.m. to 6 p.m. General adult admission is \$5. For more information contact National Computer Shows, P.O. Box 678, Brookline, MA 02147; (617) 524-4547.

New Jersey Fleamarket

The 1980 New Jersey Personal Computer Show and Fleamarket will be held September 27 and 28 at the Holiday Inn (North), at Newark International Airport (NJ Turnpike Exit 14). The show will feature an indoor commercial exhibit area, a large outdoor fleamarket, and user group meetings/forums on the TRS-80, PET, Apple, Heath and other popular systems. For additional information write NJPCS, Kengore Corporation, 9 James Avenue, Kendall Park, NJ 08824.

Information Technology Report

Information and Communication Technology for the Community, a 118 page report published by the Center for Urban Education (CUE), evolved from the idea that our society is making the transition from an energy-based to an information-based economy. The report contends that public awareness of information and communication technology and its implications can ease the transition.

Prepared by Steve Johnson, the report discusses over a year of involvement by CUE in the use of a computer-assisted communication system, the Electronic Information and Exchange System (EIES). This computer-conferencing system was devel-

oped and is maintained at the New Jersey Institute of Technology.

EIES has gained national attention as an innovative communication system with a book published in 1979, *The Network Nation*. There are presently over 700 individuals and organizations in the United States and Europe using EIES, including academic researchers, neighborhood and community groups, state legislative assemblies and appropriate technology groups.

The report describes the many current and future applications of such computer-aided communication systems, as well as offering an assessment of some of the social and political implications of the new information and communication technology.

Single copies of the report are available for \$10 from the Center for Urban Education, 0245 S.W. Bancroft, Portland, OR 97201; (503) 221-0984.

Virginia Hamfest

The Fifth Annual Tidewater Hamfest-Computer Show-Flea Market will be held in the Virginia Beach, VA, Arts and Conference Center, October 4 and 5 from 9 a.m. to 4 p.m. each day. Featured are ARRL, Traffic, DX, Technical Forums, XYL free bingo and lounge. Admission is \$3.50. There will be an advance ticket drawing for Kenwood FM transceiver. Flea market spaces \$3.00 day. For tickets and information contact TRC, P.O. Box 7101, Portsmouth, VA 23707; include self-addressed, stamped envelope.

Unusual Application?

If you use your computer for an interesting or intriguing application, why not write up a short (500 to 1000 words) article telling us about it? Make it light and newsy. Send your submission to Random Access, *Personal Computing*, 1050 Commonwealth Ave., Boston, MA 02215.

How do you Sell to Japan's \$5 billion computer/data communications equipment market?

Through IMMM/Datacomm '81 Japan — your best means of penetrating this exploding market. It's the logical choice.

1. The Market Facts. Japan's need for mini and microcomputers, microprocessors, data communications and distributed data processing equipment is growing at a rate of 13% annually — a projected \$5 billion market for equipment.

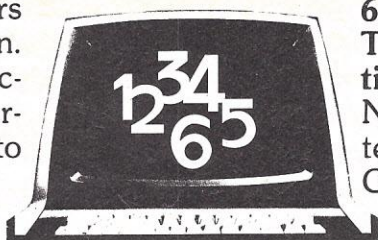
2. The Trends. Imports of computer and peripheral equipment are projected to increase 16.5% in 1980. Imports of data communications equipment are estimated to double by 1982.

3. The Statistics of Last Year's Outstanding Show. Over 15,000 qualified buyers attended IMMM/Datacomm '80 Japan. From OEM and equipment manufacturers to financial/insurance and service industries. From end-users to electronic and computer designers.

4. The Typical Enthusiastic Comment About IMMM/Datacomm Japan. "IMMM/Datacomm is specialised. We had a considerable quantity of inquiries to our products (about \$5 million) and we will exhibit at the fair next year." Mr. Merguro, Business Manager, Shoshin Shoji.

5. A Qualified Audience. Through sophisticated audience-gathering techniques, you are assured of a quality audience interested only in computer/data communications equipment. Plus, a bonus audience of engineering specialist from the largest electronics production exhibition — Internecon/Semiconductor International — which is held concurrently.

6. Endorsed and Supported by These Leading Industry Publications. Digital Design, Minicomputer News, Denshi Zairyo, Mini-Micro Systems, Personal Computing, Business Communications, and Computopia.



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Stock Option Analysis

—BY WILLIAM LAPPEN—

Stock options allow investors to participate in the price movements of stock without actually owning the stock. This article describes a method of analyzing stock option positions that can be structured to decrease the investor's risk of loss. There will be no discussion of how to predict stock movement (because I am not sure it can be done consistently). Rather, given an investor's prediction, we can determine how to structure holdings to profit from the movement without risking too much money.

Stock options come in two kinds. First, there is the *call*, which allows the owner to buy stock at a set price for a given period of time. For example, if you own a Honeywell JAN/80, you can buy 100 shares of Honeywell stock until January for \$80 per share. (Options are traded in quantities of 100.) If the underlying stock, Honeywell, sold for \$70 in January, the option would be worthless and you would not *exercise* it. (You can buy the stock on the market for \$70, so why pay \$80 for it?) If, on the other hand, the stock sold for \$90, the option would be worth \$10. You can buy the stock for \$80 and immediately sell it for \$90. Sounds like betting on the future price of a stock doesn't it? That's what you are doing.

The other kind of option is called a *put*. Conceptually, a put is not much different from a call. It allows the owner to sell stock for a certain price during a fixed time period. If, instead of owning a call on Honeywell, you own a JAN/80 put, your profits would be exactly the opposite of those under the above analysis of a call. If the stock traded for \$70, you could buy 100 shares for that price and require the person who sold you the put to pay \$80 for the stock. If the stock sold for \$90, you would not think too highly of requiring somebody else to pay you \$80 for it, so the put would be worthless.

Let's use Honeywell stock as an example of how to put together different strategies. I'm going to use prices pulled from the newspaper on January 19, 1980. A rather popular strategy is to buy 100 shares of stock and sell one option (covering 100 shares). The purpose of this strategy is to bring in extra income for the stock owner while giving up profit if the stock appreciates. In other words, the investor has the risk if the stock price falls, but gets little if the stock price rises.

The listed program runs on a TRS-80 Level II with a printer. As the program is now written, the output goes automatically to the line printer. If you prefer to display the information on the screen, merely replace all LPRINT commands with PRINT.

To enter the aforementioned strategy into the program, you will need to enter the stock name, Honeywell, and the date, 1/19/80. The stock closed trading at \$89-3/8; and February, May and August options are available on the stock. (This data is listed in the financial section of your newspaper.) The strategy is to hold one share of stock for

every one share we sell a call option against. Therefore, we will be "long" one share of stock. While we are holding the stock, we'll receive dividends, which are entered into the computer to allow it to compute actual cash inflows.

We're only interested in one kind of call and no puts on this run. Therefore, we enter that we want to be long — 1 calls. In other words, we don't want to own a call, we want to sell it. Next, enter the prices for the call at the different periods. You will note that the farther the expiration data of the option, the more it will be worth because the seller is undertaking a greater risk of adverse stock price movement; there is more time for the stock to move. Finally, tell the computer where to start the analysis (what is the lowest likely stock price when the option expires). That's all the computer needs to generate the rest of Figure 1.

Let's look at Figure 1 to see what this strategy would do for us. If the stock price was \$70 at the expiration of the February call option, we'd be left with the stock, but the call we sold would not be exercised against us. Therefore, our loss would be the amount that the stock has declined from the price we paid less the amount we received for selling the call. The price slipped from \$89.375 to \$70. That represents a loss of \$19.375. If we hadn't sold the call option, that's the loss we would have suffered. Because we got \$10.75 for selling the call, our actual loss is only \$8.625. While we have lost money, the loss is greatly reduced because of the call. This is the reason people sell calls on the stock they own.

As you can see from Figure 1, we would not lose any

CURRENT STOCK PRICE		89.375			
NUMBER OF SHARES OF STOCK LONG		1			
		LONG	FEB	MAY	AUG
CALL	80	-1.00	10.750	13.500	14.750
DIVIDENDS			0.000	0.650	0.650
		PROFIT			
PRICE AT EXPIRATION		FEB	MAY	AUG	
70		-8.625	-5.225	-3.325	
72		-6.625	-3.225	-1.325	
74		-4.625	-1.225	0.675	
76		-2.625	0.775	2.675	
78		-0.625	2.775	4.675	
80		1.375	4.775	6.675	
82		1.375	4.775	6.675	
84		1.375	4.775	6.675	
86		1.375	4.775	6.675	
88		1.375	4.775	6.675	
90		1.375	4.775	6.675	
92		1.375	4.775	6.675	
94		1.375	4.775	6.675	
96		1.375	4.775	6.675	
98		1.375	4.775	6.675	
100		1.375	4.775	6.675	
102		1.375	4.775	6.675	
104		1.375	4.775	6.675	
106		1.375	4.775	6.675	
108		1.375	4.775	6.675	

Figure 1

Mr. Lappen is currently a graduate student in both law and business schools where his concentration is Finance. A frequent contributor to Personal Computing, his previous articles include "Check Entry and Retrieval System" (June 1980), "When to Sell A Bond" (April 1980) and "How Much Does that Bond Really Yield?" (March 1980).

money unless the stock price dropped below \$80 in February, but the price we pay for this lessened risk is that our maximum profit is limited to \$1.375. To see how this happens, let's assume that the stock is selling for \$100 per share in February. The person we sold the call option to would exercise the option against us. Thus, we would be forced to hand over our 100 shares for \$80 per share. The person can sell them for \$100 apiece, but we have contracted to sell them for \$80. We do make a profit, though, because we paid \$89.375 for the stock and charged \$10.75 for the call option we sold. Therefore, we really only paid a net price of \$78.625 (\$89.375 - \$10.75) and we are now selling the stock for \$80. Thus, the profit is \$1.375 per share.

The only difference with selling May calls would be the different price for the call and the fact that we would receive one dividend while holding the stock. (Options may be exercised any time before they expire, but they are usually not exercised until their last week or so.)

Looking at Figure 1, you may wonder how you could protect yourself if the stock price falls. One way is to purchase a put and Figure 2 shows the analysis of this new strategy. Note that there is no change in profit no matter what the stock price actually is at expiration. To see how this works, let's evaluate our position if the price ends at \$70 per share. We would have paid \$89.375 for one share of stock and \$1.125 for a put on one share. In addition, we sold a call so we would receive \$10.75. Therefore, our net cost is \$79.75 (\$89.375 + \$1.125 - \$10.75). At expiration, the call we sold is worthless and will cause us no grief but the put we bought is valuable, because it allows us to put the stock to some poor sucker and require that they pay us \$80 for it. Therefore, we will gain 25 cents.

If the stock price was \$100 at expiration, our put would be valueless and we would be required to sell our stock to the person who bought our call. Thus, we would receive \$80. This also leaves us with a profit of 25 cents.

Before you rush right out and call your broker, bear in mind that this program does not consider brokerage commis-

CURRENT STOCK PRICE	89.375			
NUMBER OF SHARES OF STOCK LONG	1			
	LONG	FEB	MAY	AUG
PUT 80	1.00	1.125	3.125	4.375
CALL 80	-1.00	10.750	13.500	14.750
DIVIDENDS		0.000	0.650	0.650

	PROFIT		
PRICE AT EXPIRATION	FEB	MAY	AUG
70	0.250	1.650	2.300
72	0.250	1.650	2.300
74	0.250	1.650	2.300
76	0.250	1.650	2.300
78	0.250	1.650	2.300
80	0.250	1.650	2.300
82	0.250	1.650	2.300
84	0.250	1.650	2.300
86	0.250	1.650	2.300
88	0.250	1.650	2.300
90	0.250	1.650	2.300
92	0.250	1.650	2.300
94	0.250	1.650	2.300
96	0.250	1.650	2.300
98	0.250	1.650	2.300
100	0.250	1.650	2.300
102	0.250	1.650	2.300
104	0.250	1.650	2.300
106	0.250	1.650	2.300
108	0.250	1.650	2.300

Figure 2

Program Listing

```

10 'OPTION ANALYSIS 1/21/80
20 CLEAR 2000
30 CLS
40 DEFINT I
50 DIM A(10,10)
60 A$(0)="NOW"
70 INPUT "STOCK NAME ";N$
80 INPUT "DATE ";D$
90 PRINT "CURRENT STOCK PRICE ";P
100 INPUT P
110 PRINT "EXPIRATION MONTH ";A$(1)
120 INPUT A$(1)
130 PRINT "EXPIRATION MONTH ";A$(2)
140 INPUT A$(2)
150 PRINT "EXPIRATION MONTH ";A$(3)
160 INPUT A$(3)
170 PRINT "NUMBER OF SHARES OF STOCK LONG ";SN
180 INPUT SN
190 IF SN=0 GOTO 240
200 FOR I=1 TO 3
210 PRINT "DIVIDEND FOR ";A$(I-1);" TO ";A$(I); D(I)
220 INPUT D(I)
230 NEXT I
240 PRINT "NUMBER OF RELEVANT PUT STRIKE PRICES ";PR
250 INPUT PR
260 IF PR<1 GOTO 330
270 FOR I=1 TO PR
280 PRINT "NUMBER OF PUTS LONG ";PN(I)
290 INPUT PN(I)
300 PRINT "STRIKE OF PUT ";PS(I)
310 INPUT PS(I)
320 NEXT I
330 PRINT "NUMBER OF RELEVANT CALL STRIKE PRICES ";CR
340 INPUT CR
350 IF CR<1 GOTO 420
360 FOR I=1 TO CR
370 PRINT "NUMBER OF CALLS LONG ";CN(I)
380 INPUT CN(I)
390 PRINT "STRIKE OF CALLS ";CS(I)
400 INPUT CS(I)
410 NEXT I
420 IF PR=0 GOTO 490
430 FOR IJ=1 TO PR
440 FOR I=1 TO 3
450 PRINT A$(I); PS(IJ); "PUT PREMIUM "; A(IJ,I)
460 INPUT A(IJ,I)
470 NEXT I
480 NEXT IJ
490 IF CR=0 GOTO 560
500 FOR IJ=1 TO CR
510 FOR I=1 TO 3
520 PRINT A$(I); CS(IJ); "CALL PREMIUM "; A(IJ+5,I)
530 INPUT A(IJ+5,I)
540 NEXT I
550 NEXT IJ
560 I=P
570 INPUT "START PRICE ";I1
580 I2=I+(I-I1)
590 INPUT "PAPER IN PRINTER "; A$
600 LPRINT TAB(30) N$
610 LPRINT TAB(30) D$
620 LPRINT
630 LPRINT
640 LPRINT "CURRENT STOCK PRICE ";P
650 LPRINT "NUMBER OF SHARES OF STOCK LONG ";SN
660 LPRINT TAB(15) "LONG";TAB(25) A$(1);TAB(35)
    A$(2);TAB(45) A$(3)
670 IF PR<1 GOTO 780
680 FOR IJ=1 TO PR
690 LPRINT "PUT ";PS(IJ);
700 LPRINT TAB(13);
710 LPRINT USING "###.###"; PN(IJ);
720 FOR I=1 TO 3
730 LPRINT TAB(12+I*10);
740 LPRINT USING "###.###"; A(IJ,I);
750 NEXT I
760 LPRINT
770 NEXT IJ
780 IF CR<1 GOTO 890
790 FOR IJ=1 TO CR
800 LPRINT "CALL ";CS(IJ);
810 LPRINT TAB(13);
820 LPRINT USING "###.###"; CN(IJ);
830 FOR I=1 TO 3
840 LPRINT TAB(12+I*10);
850 LPRINT USING "###.###"; A(IJ+5,I);
860 NEXT I

```

continued

sions or the interest lost on the money invested. These considerations can be added. Commissions are generally not too great, but interest may be. For example, in the position illustrated in Figure 2, we would tie up \$79.75 (plus commission) for about one month. This money could earn about 33 cents at five percent. Thus, the 25 cent profit doesn't look too great. But then again, there is no risk at all.

What would happen if we didn't buy the stock at all? Let's sell one February put for every one February call we sell. This is a risky strategy, but has some nice features. As you can see from Figure 3, we would lose \$5 if the stock ended up at either \$70 or \$100. Let's analyze \$70 first. The call would not be exercised, so we made a profit of \$10.75 on that sale. The put would be exercised, however and we would have to buy stock at \$90 that is only worth \$70. Therefore, we would lose \$15.75 on the put (\$4.25 - \$20) giving us a net loss of \$5. If the stock were selling for \$100 at expiration, we would pocket the put money (\$4.25) and lose a net of \$9.25 on the call (\$10.75 - \$20). This also gives a loss of \$5.

Notice that we profit from stock price stagnancy using the strategy of Figure 3. If the stock price stays anywhere between \$80 and \$90, we make a profit of \$5. This is a pretty large range for a maximum profit and we would profit as long as the stock remains between \$76 and \$94. All of a sudden, stock ownership doesn't look so great.

Now, let's really complicate the strategy. Looking at the profit range from Figure 3, you may get uncomfortable with the fact that the stock price is currently at the top of the maximum profit range. There is a way to move the range around a bit. Looking at Figure 4, we see that selling twice as many puts as calls shifts the profit range to between \$82 and \$98. Notice that the maximum profit is obtained at \$90 and the profit between \$86 and \$94 is greater than that obtained under the Figure 3 strategy. Also notice that the profit is less (or the loss is greater) if the stock price is under \$86, but the profit is higher for every price over \$86. If you feel the price will be higher than \$86 in about a month, this may well be the strategy for you.

This program provides a method for analyzing very com-

Program Listing continued

```

870 LPRINT
880 NEXT IJ
890 IF SN=0 GOTO 960
900 LPRINT "DIVIDENDS";
910 FOR I=1 TO 3
920 LPRINT TAB(12+I*10);
930 LPRINT USING "###.###"; D(I);
940 NEXT I
950 LPRINT
960 LPRINT
970 LPRINT TAB(30) "PROFIT"
980 LPRINT
990 LPRINT "PRICE AT EXPIRATION";TAB(25)A$(1);
    TAB(35)A$(2);TAB(45)A$(3)
1000 LPRINT
1010 FOR I=I1 TO I2 STEP 2
1020 LPRINT TAB(8);
1030 LPRINT USING "###"; I;
1040 FOR IJ=1 TO 3
1050 T=SN*(I-P)
1060 IF SN=0 GOTO 1100
1070 FOR II=1 TO IJ
1080 T=T+SN*D(II)
1090 NEXT II
1100 IF PR<1 GOTO 1150
1110 FOR II=1 TO PR
1120 T=T-PN(II)*A(II,IJ)
1130 IF I<PS(II) THEN T=T+PN(II)*(PS(II)-I)
1140 NEXT II
1150 IF CR<1 GOTO 1200
1160 FOR II=1 TO CR
1170 T=T-CN(II)*A(II+5,IJ)
1180 IF I>CS(II) THEN T=T+CN(II)*(I-CS(II))
1190 NEXT II
1200 LPRINT TAB(12+IJ*10);
1210 LPRINT USING "###.###"; T;
1220 NEXT IJ
1230 LPRINT
1240 IF INT(I/5)*5=I THEN LPRINT
1250 NEXT I
1260 GOTO 170

```

plicated option strategies. It allows you to buy or sell any number of options or shares of stock and provides information as to profit or loss at expiration. Before investing any money, talk with a good stockbroker who is knowledgeable in the field of options. You will need to get information on margin and commissions and option trading in general. □

CURRENT STOCK PRICE 89.375				
NUMBER OF SHARES OF STOCK LONG 0				
	LONG	FEB	MAY	AUG
PUT 90	-1.00	4.250	6.750	8.625
CALL 80	-1.00	10.750	13.500	14.750
PROFIT				
PRICE AT EXPIRATION	FEB	MAY	AUG	
70	-5.000	0.250	3.375	
72	-3.000	2.250	5.375	
74	-1.000	4.250	7.375	
76	1.000	6.250	9.375	
78	3.000	8.250	11.375	
80	5.000	10.250	13.375	
82	5.000	10.250	13.375	
84	5.000	10.250	13.375	
86	5.000	10.250	13.375	
88	5.000	10.250	13.375	
90	5.000	10.250	13.375	
92	3.000	8.250	11.375	
94	1.000	6.250	9.375	
96	-1.000	4.250	7.375	
98	-3.000	2.250	5.375	
100	-5.000	0.250	3.375	
102	-7.000	-1.750	1.375	
104	-9.000	-3.750	-0.625	
106	-11.000	-5.750	-2.625	
108	-13.000	-7.750	-4.625	

Figure 3

CURRENT STOCK PRICE 89.375				
NUMBER OF SHARES OF STOCK LONG 0				
	LONG	FEB	MAY	AUG
PUT 90	-2.00	4.250	6.750	8.625
CALL 80	-1.00	10.750	13.500	14.750
PROFIT				
PRICE AT EXPIRATION	FEB	MAY	AUG	
70	-20.750	-13.000	-8.000	
72	-16.750	-9.000	-4.000	
74	-12.750	-5.000	0.000	
76	-8.750	-1.000	4.000	
78	-4.750	3.000	8.000	
80	-0.750	7.000	12.000	
82	1.250	9.000	14.000	
84	3.250	11.000	16.000	
86	5.250	13.000	18.000	
88	7.250	15.000	20.000	
90	9.250	17.000	22.000	
92	7.250	15.000	20.000	
94	5.250	13.000	18.000	
96	3.250	11.000	16.000	
98	1.250	9.000	14.000	
100	-0.750	7.000	12.000	
102	-2.750	5.000	10.000	
104	-4.750	3.000	8.000	
106	-6.750	1.000	6.000	
108	-8.750	-1.000	4.000	

Figure 4

Personal Finance Management

—BY E. E. COMSTOCK—

My wife and I purchased a computer to help with our home finances and other tasks. We obtained several personal finance programs, each designed to accomplish the chore. My wife spent hours computing figures with these programs — the computer seemed to be working out well. Then I noticed a change. She went back to counting on her fingers and assured me that once the importance of showmanship on the computer wore off, the program was just too much trouble.

What were the hangups? How could I debug her problems?

Correction of mistakes caused her the greatest frustration. One program made her retype a list of fifty checks over and over again to correct a few errors. Another program called for inserting a different tape and following directions for changing and updating data; the problem resulted from not making a perfect copy the first time.

After about six months of programming and testing, I came up with this Personal Finance program as a solution. It handles data in an unorthodox manner suitable for other uses as well. It's written for a Radio Shack TRS-80 Level II but should work on other Basic computers with few or no changes. 16K RAM will handle about 100 transactions, which is more than enough for a family for a month. More on that later.

The data handling method used in this program differs from others in using the line numbers as part of the active data. That is, your check number becomes the line number for that check's DATA statement. For example, suppose you wrote check number 235 for \$36.45 to Jack's Hardware on November 3 (1103 to the computer), and this payment falls under code number 16 (more on category codes later). Your DATA statement would be:

235 DATA-36.45,16,1103,JACK'S

HARDWARE

Personal Finance performs simple functions to reconcile bank statements. You do not have to arrange the checks in serial order but just ENTER them in the random order as they come from the

bank. Later when you list the checks (data) you'll find that the computer has automatically arranged all checks in proper order. The obvious missing checks will be those now outstanding.

If you ENTER the balance brought forward on the statement you should, upon processing option 2 in the program, agree with the bank — unless you make an error. (I have it on good authority that this does happen.) If there is an error, check your listing to make sure all entries were made properly. Watch those three commas especially. Do not misspell DATA.

If you agree with the statement's balance, go to your checkbooks and mark off all the cancelled checks. Next, account for all outstanding unpaid checks and enter them as data items in the program — but be sure the computer shows READY. The program provides for this a number of times with an "E" (end program) entry and in Options 1, 6 and 10. You can of course type BREAK and get READY at anytime.

When you ENTER outstanding checks put an asterisk off to the right. This flag will show up readily on any listing. Processing this update under Option 2 will give you the true checkbook balance at the moment. You can now make the monthly tape: CSAVE"filename". I suggest you use "J1" for January, "D12" for December and so forth. Store this tape for future reference when you are hunting down a disputed payment or need tax information.

The next month's check payments can now be made and entered as data in the computer, which will act as a calculator and help you with the budget. Forty different codes are available. I recommend setting aside the first couple for deposits, bank charges and so forth. Regular budget items such as clothing, mortgages and food should be assigned other permanent numbers. Also, you can assign codes to specific firms. Executing option 2 will further update your balance and for the rest of the month you should be able to coast. Of course, if you have lots of transactions the program can handle the job.

If you have enough memory you could make a single accounting period for a whole year for an average family. You would ENTER the original program and then save a copy for safe keeping. After entering all the data for the first month, CSAVE it and update your checkbooks. In succeeding months, simply enter this tape and add new data. Since each data item has its own number which is never repeated, the accounting would be continuous.

Suppose you had an outstanding check marked by the asterisk flag in an earlier program and the bank now cancelled it. When you reconcile the new pile of checks you would not be concerned because when you entered this same number the old DATA entry would be automatically deleted by the computer. When using Option #5, we found that the computer took several minutes to find the totals in each of the forty codes at the same time because of the large number of transactions. Getting a single answer for just one code was much quicker.

I strongly advise that after saving the original program on tape with no data entries you knock out the safety tabs on back of the tape to prevent erasing or further recording. This tape becomes your master copy.

To make the program more practical a full set of instructions can be called up by various options shown in the menu. I added a short cut (not used in any programs I know of). You can return to the MENU any time simply by entering "RUN 50150".

The program is written in very high line numbers to insure isolation from data and to allow for entering data tapes not covered by this particular program.

Before you type the entire program you may wish to see what you are getting into and make sure it's worth all the trouble. Try entering the following small part of the program.

```
50220 READ CH, CD, DT, DSS : PRINT  
      "CHECK AMT", "CODE#",  
      "DATE", "PAYEE"  
50230 PRINT CH, CD, DT, DSS : BA =  
      BA + CH : PRINT BA "BALANCE"  
50235 GOTO 50220
```


Program Listing

```

50000 DATA 0,0,0,0
50010 GOTO 50110
50020 CLS : PRINT @ 10 ,;" $ $ PERSONAL FINANCE $ $"
50030 PRINT @ 64,;"COPYRIGHT 050179 : E.E.COMSTOCK ,PT.WASH.:"
50040 PRINT " FLA.32454 RT2,BOX26 "
50050 PRINT STRING$(63,"$")
50060 PRINT "BEGIN BY ENTERING ALL DATA FROM BANK STATEMENT IN RANDOM ORDER
      .USE THIS FORMAT :: (CHECK)SERIAL# 'DATA' (-)AMOUNT ' , ' CODE ' ,
      ' DATE ' , ' DESCR.

EXAMPLE : >2301 DATA -235.00 , 25 , 0112 , JOE CHECK "
50070 PRINT :PRINT "NOTE : FOR DATA WITHOUT SERIAL #'S SUCH AS A BANK DEPOSIT,
      CHARGE,ETC.,SELECT A SERIAL NUMBER OF A BLANK CHECK. SEE INST.7&8."
50080 PRINT
50090 PRINT "ENTER DATA NOW AND / OR TYPE ' RUN ' TO CONTINUE OR
      RETURN DIRECT TO MENU BY TYPING 'RUN 50150 ' "
50100 PRINT STRING$(63,"$") : STOP
50110 CLS : FOR J = 1 TO 459 : PRINT CHR$(140);:NEXT
50120 PRINT @ 460,;"THIS IS YOUR PERSONAL FINANCE PROGRAM ";
50125 FOR J=1 TO 6 : PRINTCHR$(191);:NEXTJ
50130 FOR J = 1 TO 456 : PRINT CHR$(140);:NEXT
50140 FOR J = 1 TO 1000 : NEXT
50142 PRINT@ 460,;"COPYRIGHT E.E. COMSTOCK 05/01/79 ";;:FORJ=1TO6
      :PRINTCHR$(191);:NEXTJ
50144 FOR J=1TO1000:NEXT
50149 GOTO 50730
50150 CLS : PRINT STRING$(18,"$") ; " PERSONAL FINANCE PROGRAM "
      : STRING$(20,"$")
50155 CLEAR 3500:DIM A(40)
50160 PRINT"THESE ARE YOUR OPTIONS :
      1 - INPUT DATA
      2 - PROCESS DATA
      3 - SORT DATA BY CODE
      4 - SORT DATA BY DATE
      5 - CODE LISTING
      6 - DATA LISTING"
50170 PRINT" 7 - INSTRUCTIONS PART A
      8 - INSTRUCTIONS PART B
      9 - INITIAL INSTRUCTIONS
      10 - A PLUS SURPRISE
50180 PRINT @ 832,;"ENTER YOUR SELECTION : " ;; INPUT OP$
50190 IF OP$ <> "1" AND OP$ <> "2"AND OP$ <> "3" AND OP$ <> "4" AND
      OP$ <> "5" AND OP$ <> "6" AND OP$<>"7" AND OP$<>"8" AND OP$<>"9"
      AND OP$<>"10"THEN 50180 ELSE OP = VAL (OP$)
50200 ON OP GOTO 50020,50210,50260,50330,50390,50510,50570,
      50680,50730,50790 :GOTO 50180
50210 BA = 0 : RESTORE
50220 READ CH,CD,DT,DS$ : IF CD = 0 THEN 50240 ELSE 50230
50230 BA = BA + CH : GOTO 50220
50240 CLS : PRINT STRING$(18,"$") ; " B A L A N C E R E P O R T " ; STRING$(17,"$")
50250 PRINT : PRINT USING "YOUR BALANCE AS OF TODAY = +#####.## " ; BA :GOTO 50320
50260 TT = 0 : RESTORE : CLS : PRINT STRING$(20,"$") ; " S O R T R O U T I N E " ; STRING$ ( 20, "$")
50270 PRINT @ 256 ,; " ENTER CODE NUMBER TO BE SORTED : " ; INPUT SO
50280 READ AM,CN,DT,DS$ : IF AM = 0 THEN 50310 ELSE 50290
50290 IF CN <> 80 THEN 50280 ELSE 50300
50300 TT = TT + AM : GOTO 50280
50310 PRINT @ 768 ,; "TOTAL AMOUNT FOR CODE " ; SO :;PRINTUSING" IS = +#####.##":TT
50320 PRINT @ 909 ,; "HIT Y-CONTINUE OR E-END PROGRAM : " ; INPUT YE$ : IF YE$ = "Y" 50150 ELSE IF YE$ = "E" THEN END
      ELSE50320
50330 TA = 0 : RESTORE : CLS : PRINT STRING$(16,"$") ; " D A T E S O R T R O U T I N E " ; STRING$(15,"$")
50340 PRINT @ 256 ,; " ENTER DATE TO BE SORTED <X. MMDD > " ;
      INPUT SD
50350 READ CA,CO,DA,DS$ : IF CA = 0 THEN 50380 ELSE 50360
50360 IF SD <> DA THEN 50350 ELSE 50370
50370 TA = TA + CA : GOTO 50350
50380 PRINT @ 768 ,; " TOTAL AMOUNT ON " ; SD :;PRINTUSING" IS = +#####.##" ; TA:GOTO 50320
50390 FOR J = 1 TO 40 : A(J) = 0 : NEXT :AT=0:CLS : PRINT STRING$(11,"$") ; " C O M P L E T E C O D E L I S T I N G " ;
      STRING$(11,"$")
50400 PRINT @ 81 ,; " BE PATIENT WHILE COMPUTING : "
50410 PRINT @ 64,;"
      CODE AMOUNT CODE AMOUNT CODE AMOUNT CODE AMOUNT"
50420 PRINT@474,;"COMPUTING....."
50430 FOR I = 1 TO 40 : RESTORE
50440 READ AM,CN,DT,DS$:IFCN=0THEN50470
50450 IF CN = I THEN A(I) = A(I) + AM
50460 GOTO50440
50470 NEXT I
50480 Q = 0 :FOR K = 16 TO 55 : AT = K * 16 : Q = Q + 1
50490 PRINT @ AT ,;:PRINT USING" ## #####.## " ;Q,A(Q) : NEXTK
50500 PRINT @ 906,;"TYPE Y - CONTINUE OR E - END : " ;:INPUT EY$ : IF EY$ = "Y" THEN 50150 ELSE IF EY$ = "E" THEN CLS
      :STOP ELSE50500
50510 CLS :PRINT STRING$(17,"$") ; " D A T A L I S T I N G " ; STRING$(18,"$")
50520 PRINT"TO LIST DATA TYPE 'LIST 1 - 49999'. IF YOU HAVE MORE THAN 16
      TRANSACTIONS, WHICH IS ONE FULL DISPLAY, THEN YOU MAY DESIRE
      TO VIEW THE DATA IN GROUPS OF 15 OR 16, IN WHICH CASE, FOR
      EXAMPLE TYPE 'LIST 234 - 249'. YOU MAY LIST";
50530 PRINT" ANY GROUP OF";
50540 PRINT"
      CHECKS BY THIS METHOD. IN ADDITION TO THIS YOU MAY MAKE CORRECT-IONS TO ANY
      CHECK BY RETYPING THE CHECK NUMBER AS YOU LIST. AS AN ALTERNATIVE TO THE
      PREVIOUS LISTING METHOD YOU MAY CON-
      SIDER STOPPING THE LISTING BY SIMULTANEOUSLY HOLDING DOWN";
50550 PRINT" '@";
50552 PRINT"
      AND THE 'SHIFT' KEYS. TO CONTINUE THE LISTING PRESS ANY KEY.
      AFTER COMPLETING THE LISTING YOU MAY TYPE 'RUN' TO EXECUTE THE
      PROGRAM OR CSAVE THE PROGRAM IF ANY ADDITIONS OR CHANGES HAVE
      BEEN MADE OR JUST STOP...FOR MENU YOU CAN TYPE 'RUN 50150' "
50554 PRINTSTRING$(63,"$"):END
50560 PRINTSTRING$(64,"$")

```

For a test, type in a few checks as DATA. Use negative values for charges. Deposits will be positive and so need not be specially marked. To give every transaction a record number I recommend that you tear up a blank check and use its number for deposits, bank charges, and so forth. The date is shown as MMDD. The year YY, entirely unnecessary, is left out to save bytes.

After entering the above lines you can add the checks and deposits. Example:

```

234 DATA 1000.00,1,1203,salary
      deposit
123 DATA-345.67,20,1204,Wiggly
      Pig

```

When run, these two transactions will be reversed into serial order.

If you made a mistake in data, for example in check #123, merely EDIT 123 and make the change as per instructions in your TRS-80 manual. Or, you can type the entire line over again and the bad entry will be erased.

Now that you've decided to type in the whole program, take it easy and do a few lines at a time; then CSAVE what you've done. Just CLOAD it the next time you start. Be very careful when recording any tape that you turn the tape past those ##\$## leaders! □

Menu of Options

1. Input data
2. Process data
3. Sort data by code
4. Sort data by date
5. Code listing
6. Data listing
7. Instructions part A
8. Instructions part B
9. Initial instructions
10. A plus surprise


```

50570 CLS : PRINTSTRING$(20,"$");" INSTRUCTIONS
PART A " :STRING$(20,"$")
50580 PRINT"
THIS PROGRAM WILL ENABLE YOU TO RECONCILE YOUR BANK
STATEMENTS,
BALANCE CHECK BOOKS, ACCESS ANY PAID OR OUTSTANDING CHECKS BY
NUMBER OR DATE, BUDGET FUNDS, AND KEEP RUNNING BALANCES OF
EXPENDITURES IN 40 DIFFERENT ACCTS OR";
50590 PRINT" CODES. UNLIKE MOST OTHER"
50600 PRINT"HOME COMPUTER FINANCE PROGRAMS YOU CAN ADD TO,
CHANGE, DELETE ANY DATA AT ANY TIME WITH THIS VERY UNIQUE
SYSTEM ....."
50610 PRINT"START BY RECONCILING 1ST BANK STATEMENT... ENTE
R BEGINNING FUNDSUSING A BLANK CK # (UNUSED)....."

EXAMPLE : 222 DATA 333.33 ,1, 0101 ,BNK,BAL."

50615 PRINT"
(NOTE : BE SURE TO ASSIGN NEGATIVE SIGNS TO LIABILITIES )"
50620 PRINT@900,;"Y - CONT. INSTRUCTIONS M - RETURN TO MENU
E - END : " ;:INPUTYE$;IF YE$="Y"THEN50630ELSEIFYE$="M"
THEN50150ELSEIFYE$="E"THEN50650ELSE50620
50630 CLS : PRINTSTRING$(20,"$");" INSTRUCTIONS
PART A " :STRING$(20,"$")
50640 PRINT"
ENTER DATA FOR EACH RANDOM CHECK ETC. THEN EXECUTE OPTION 2
TO OBTAIN FINAL BALANCE. OPTION SIX WILL ARRANGE CHECKS IN
SERIAL ORDER, THEN MARK OFF CHECK STUBS. NOTE OUTSTANDING
CHECKS. ENTER THEIR DATA FOLLOWED BY FLAG (*,.,");
50650 PRINT" LATER WHEN CHECKS ARE "
50660 PRINT"CANCELLED DELETE (*).EXECUTING OPTION 2 AGAIN
WILL UPDATE CHECK BALANCE. NOW ENTER DATA PROPOSED NEW CHECK
PAYMENTS, DEPOSITS, ETC. OPTION 2 PROJECTS A BALANCE. RETYPE
DESIRED DATA CHANGES. WHEN SATISFIED, PREPARE ACTUAL PAYMENTY.
50665 PRINT"
STORE MASTER PROGRAM FOR NEXT TIME. SUGGEST SEPARATE TAPE FOR
EACH MONTHLY FILE "
50670 GOTO50320
50680 CLS : PRINTSTRING$(20,"$");" INSTRUCTIONS
PART B " :STRING$(20,"$")
50690 PRINT"
YOU WILL NEED TO SET UP PERMANENT BUDGET CODES BETWEEN 1-40
IN-CLUSIVE. RESERVE THE FIRST FEW CODES FOR BANK DEPOSITS,
CHARGES,ETC. YOU CAN ASSIGN SPECIFIC ACCOUNTS .";
50700 PRINT"
EXAMPLE : 1 = DEPOSITS AND INITIAL BALANCE ( + )
2 = SERVICE CHARGES
4 = MORTGAGE
15 = TRANSPORTATION
20 = MEDICAL
25 = CLOTHING
30 = FOOD
31 = BLANK BLANK COMPANY"
50710 PRINT" 32 = MISCELLANEOUS"
50720 GOTO50320
50730 CLS : PRINT@464,;"ARE YOU AQUAINTED WITH THIS PROGRAM
Y - YES N - NO " ;: INPUT YN$
: IF YN$ = "Y" THEN 50150 ELSE IF YN$ = "N" THEN 50740
ELSE 50730
50740 CLS : PRINTSTRING$(21,"$");" INITIAL INSTRUCTIONS " ;
STRING$(20,"$")
50750 PRINT"
THIS PROGRAM PERFORMS FUNCTIONS TO:
1.RECONCILE BANK STATEMENTS
2.AUTOMATICALLY ARRANGES ALL CHECKS IN SERIAL ORDER
3.UPDATES CHECKBOOK
4.INDICATE OUTSTANDING CHECK BY / * /
5.EXECUTE A BUDGET"
50760 PRINT" 6.COMPUTE EXPENDITURES IN EACH OF 40 BUDGET
CODES AND ACCOUNTS
7.CSAVE UPDATED RECORD FOR CURRENT MONTH ON A TAPE FILE
J1 THRU D12 (J1 IS JAN. AND D12 IS DEC. )
8.SEARCH FOR PAYMENTS MADE ,GIVEN CHECKS,ETC
50770 PRINT"GOOD LUCK AND GOOD FINANCING ! ! ! " ;GOTO50320
50790 CLS:PRINT"***** HELLO HELLO HELLO HELLO HELLO HELLO
HELLO HELLO *****"
50791 PRINT
50792 PRINT" I CAN DO MANY OTHER THINGS...HERE IS ONE : "
50793 PRINT
50800 PRINT "AS A PLUS YOU CAN ALSO KEEP RUNNING BALANCES
OF INDIVIDUAL ACCOUNTS BY UPDATING THEM AND ADD SAME TO
THE DATA LISTING IMMEDIATELY FOLLOWING 'DESCR '
IN OPTION # 1"
50820 PRINT" EXAMPLE : "
50830 PRINT "3456 DATA-123.00,29,1122,SAWBUCK CO
BAL-767.67
50833 PRINT
50835 PRINT "*****
*****"
50836 PRINT
50840 PRINT " RETURN TO MENU BY TYPING 'RUN 50150 / "

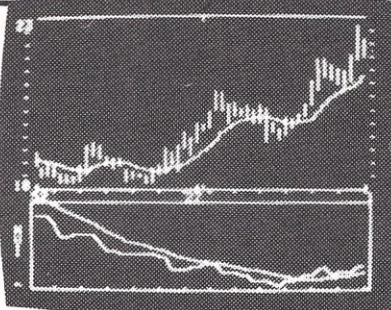
```

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Installment Sales

—BY W. B. GOLDSMITH, JR.—

You finally sold that piece of property in the mountains. Great! You had to take \$1000 down and payments of \$100 a month for awhile, but you unloaded it. Your worries about that place are over — except for the income taxes someone said you may owe on the profit you made from the sale.

It's true. At tax time, you must report the sale and pay some taxes on your gain, or at least include the gain in your gross income. Of course, you'd rather not pay income tax on the whole profit until you collect it. If you've studied your IRS booklets (or read this article), you know that you don't have to pay tax on the entire gain this year if your sale transaction meets the IRS "Installment Sale" rules. You need pay tax only on the part of the profit you collect each year. As money gets tighter and financial institutions are more reluctant to lend purchase funds — especially on vacation cabins and vacant land — more of us have to consider selling our property by "carrying our own paper."

Generally, you may elect to use the installment method of reporting profits (but not losses) when you sell personal property (a car, antiques, etc.) for a price of more than \$1000. This also applies to any real estate if you'll get payments in at least two tax years and receive less than 30% of the selling price in the year of the sale. *Since individual situations vary, see the IRS or your tax professional for advice on your specific tax situation.*

When you report the installment sale on your income tax returns, you'll note that the tax guide says something helpful, like "attach statement." Some time ago, the IRS published a worksheet for this purpose. Unfortunately, the worksheet hasn't been available in the past few years. Unless you have an accounting background and a fair tax library, that "attach statement" instruction can be a real headache — akin to "uncrash disk".

Mr. Goldsmith is enrolled to practice before the Internal Revenue Service. His previous articles include "Income Tax Deduction Worksheet" (April 1980).

Sample Run

TAXPAYER NAME? E.D.SAMPLE
IDENTIFYING NUMBER? 000-00-0000
DESCRIPTION OF PROPERTY? BRICK RESIDENCE
LOCATION OF PROPERTY (CITY, STATE)? UTOPIA, CALIFORNIA
DATE ACQUIRED? 1 MARCH 1970
DATE SOLD? 10 FEBRUARY 1980
NAME OF BUYER? PNEUGH OWNER
BUYER'S ADDRESS (CITY, STATE)? EDEN, CALIFORNIA
TOTAL SELLING PRICE? 50000
ORIGINAL COST OR BASIS? 10350
COST OF IMPROVEMENTS? 2540
DEPRECIATION ALLOWED/ALLOWABLE? 1225
SELLING EXPENSES? 2978
AMOUNT OF EXISTING MORTGAGE ON PROPERTY ASSUMED BY BUYER? 5005
DOWN PAYMENTS RECEIVED? 4800
OTHER PAYMENTS RECEIVED IN YEAR OF SALE? 200
NOTES ON THIRD PARTY RECEIVED? 1000
PRESS 'RETURN' TO PRINT?

STATEMENT OF INSTALLMENT SALE

E.D.SAMPLE		000-00-0000
DESCRIPTION OF PROPERTY:	BRICK RESIDENCE	
ADDRESS OF PROPERTY:	UTOPIA, CALIFORNIA	
DATE ACQUIRED: 1 MARCH 1970	DATE SOLD: 10 FEBRUARY 1980	
BUYER: PNEUGH OWNER		
EDEN, CALIFORNIA		
1. TOTAL SELLING PRICE		\$ 50000.00
2. ORIGINAL COST OR BASIS	\$ 10350.00	
3. PLUS COST OF IMPROVEMENTS	2540.00	
4. TOTAL COST	\$ 12890.00	
5. LESS DEPRECIATION	1225.00	
6. ADJUSTED BASIS	\$ 11665.00	
7. PLUS SELLING EXPENSES	2978.00	
8. TOTAL COST OR OTHER BASIS		14643.00
9. GAIN TO BE REALIZED		\$ 35357.00
10. AMOUNT OF MORTGAGE ASSUMED	\$ 5005.00	
11. ADJUSTED BASIS	11665.00	
12. EXCESS OF MORTGAGE OVER BASIS		\$ 0.00
13. DOWN PAYMENTS RECEIVED		4800.00
14. OTHER PAYMENTS RECEIVED		200.00
15. NOTES ON THIRD PARTY RECEIVED		1000.00
16. TOTAL INITIAL PAYMENTS IN YEAR OF SALE		\$ 6000.00
17. TOTAL SELLING PRICE	\$ 50000.00	
18. LESS LINE 10 OR 11 (WHICHEVER IS SMALLER)	5005.00	
19. TOTAL CONTRACT PRICE		\$ 44995.00
PERCENT PROFIT (LINE 9/LINE 19)		78.57 %

TAX YEAR ENDED	TOTAL PAYMENT RECEIVED	INTEREST	PRINCIPAL	% PROFIT	GAIN REALIZED	DEFERRED BALANCE
12/80	6,000.	-0-	6,000	78.57	4,714.	30,643.
12/81	5,152.	4,679.	473.	78.57	372.	30,271.
12/82	5,152.	4,623.	529.	78.57	416.	29,855.

Note information added at bottom of printout by user.

Program Listing

```

0010 REM INSTALLMENT SALE
0020 DIM A$(10),A(19)
0030 LINE= 0
0040 INPUT "TAXPAYER NAME",A$(1)
0050 INPUT "IDENTIFYING NUMBER",A$(2)
0060 INPUT "DESCRIPTION OF PROPERTY",A$(3)
0070 INPUT "LOCATION OF PROPERTY (CITY,STATE)",A$(4),A$(5)
0080 INPUT "DATE ACQUIRED",A$(6)
0090 INPUT "DATE SOLD",A$(7)
0100 INPUT "NAME OF BUYER",A$(8)
0110 INPUT "BUYER'S ADDRESS (CITY, STATE)",A$(9),A$(10)
0120 REM **COMPUTATION OF GAIN**
0130 INPUT "TOTAL SELLING PRICE",A(1)
0140 INPUT "ORIGINAL COST OR BASIS",A(2)
0150 INPUT "COST OF IMPROVEMENTS",A(3)
0160 A(4)=A(2)+A(3)
0170 INPUT "DEPRECIATION ALLOWED/ALLOWABLE",A(5)
0180 A(6)=A(4)-A(5)
0190 INPUT "SELLING EXPENSES",A(7)
0200 A(8)=A(6)+A(7)
0210 A(9)=A(1)-A(8)
0220 REM **COMPUTATION OF INITIAL PAYMENTS RECEIVED IN YEAR OF SALE**
0230 PRINT "AMOUNT OF EXISTING MORTGAGE ON ";
0240 PRINT "PROPERTY ASSUMED BY BUYER";
0250 INPUT A(10)
0260 A(11)=A(6)
0270 A(12)=A(10)-A(11)
0280 IF ABS(A(12))=A(12) THEN 300
0290 A(12)=0
0300 INPUT "DOWN PAYMENTS RECEIVED",A(13)
0310 INPUT "OTHER PAYMENTS RECEIVED IN YEAR OF SALE",A(14)
0320 INPUT "NOTES ON THIRD PARTY RECEIVED",A(15)
0330 A(16)=A(12)+A(13)+A(14)+A(15)
0340 REM **COMPUTATION OF TOTAL CONTRACT PRICE**
0350 A(17)=A(1)
0360 IF A(10)>=A(11) THEN 380
0370 A(18)=A(10)
0375 GOTO 390
0380 A(18)=A(11)
0390 A(19)=A(17)-A(18)
0400 P=(A(9)/A(19))*100
0410 DIGITS= 2
0420 INPUT "PRESS 'RETURN' TO PRINT",Z$
0425 REM ***PRINT THE DATA***
0430 PORT= 3
0440 PRINT :PRINTTAB(21);"STATEMENT OF INSTALLMENT SALE":PRINT
0450 PRINT :PRINTA$(1);TAB(58);A$(2)
0460 PRINT
0470 PRINT "DESCRIPTION OF PROPERTY: ";TAB(30);A$(3)
0480 PRINT "ADDRESS OF PROPERTY: ";TAB(30);A$(4);", ";A$(5)
0490 PRINT
0500 PRINT "DATE ACQUIRED: ";A$(6);TAB(40);"DATE SOLD: ";A$(7)
0510 PRINT
0520 PRINT "BUYER: ";A$(8)
0530 PRINT TAB(7);A$(9);", ";A$(10)
0540 PRINT :PRINT
0550 REM ***DATA***
0560 PRINT "1. TOTAL SELLING PRICE";TAB(65-LEN(STR$(A(1))));"$ ";A(1)
0570 PRINT "2. ORIGINAL COST OR BASIS";TAB(50-LEN(STR$(A(2))));"$ ";A(2)
0580 PRINT "3. PLUS COST OF IMPROVEMENTS";TAB(52-LEN(STR$(A(3))));"$ ";A(3)
0590 PRINT TAB(42);"-----"
0600 PRINT "4. TOTAL COST";TAB(50-LEN(STR$(A(4))));"$ ";A(4)
0610 PRINT "5. LESS DEPRECIATION";TAB(52-LEN(STR$(A(5))));"$ ";A(5)
0620 PRINT TAB(42);"-----"
0630 PRINT "6. ADJUSTED BASIS";TAB(50-LEN(STR$(A(6))));"$ ";A(6)
0640 PRINT "7. PLUS SELLING EXPENSES";TAB(52-LEN(STR$(A(7))));"$ ";A(7)
0650 PRINT TAB(42);"-----"
0660 PRINT "8. TOTAL COST OR OTHER BASIS";TAB(67-LEN(STR$(A(8))));"$ ";A(8)
0670 PRINT TAB(56);"-----"
0680 PRINT "9. GAIN TO BE REALIZED";TAB(65-LEN(STR$(A(9))));"$ ";A(9)
0690 PRINT TAB(56);"-----"
0700 PRINT "10. AMOUNT OF MORTGAGE ASSUMED";
0710 PRINT TAB(50-LEN(STR$(A(10))));"$ ";A(10)
0720 PRINT "11. ADJUSTED BASIS";TAB(52-LEN(STR$(A(11))));"$ ";A(11)
0730 PRINT TAB(42);"-----"
0740 PRINT "12. EXCESS OF MORTGAGE OVER BASIS";
0750 PRINT TAB(65-LEN(STR$(A(12))));"$ ";A(12)
0760 PRINT "13. DOWN PAYMENTS RECEIVED";
0770 PRINT TAB(67-LEN(STR$(A(13))));"$ ";A(13)
0780 PRINT "14. OTHER PAYMENTS RECEIVED";
0790 PRINT TAB(67-LEN(STR$(A(14))));"$ ";A(14)
0800 PRINT "15. NOTES ON THIRD PARTY RECEIVED";
0810 PRINT TAB(67-LEN(STR$(A(15))));"$ ";A(15)
0820 PRINT TAB(56);"-----"
0830 PRINT "16. TOTAL INITIAL PAYMENTS IN YEAR OF SALE";
0840 PRINT TAB(65-LEN(STR$(A(16))));"$ ";A(16)
0850 PRINT TAB(56);"-----"
0860 PRINT "17. TOTAL SELLING PRICE";TAB(50-LEN(STR$(A(17))));"$ ";A(17)
0870 PRINT "18. LESS LINE 10 OR 11"

```

Continued

Let your trusty, work-saving personal computer come to the rescue. This Installment Sale program will generate that tax return attachment for you. Even if you have professional help with your tax preparation, this routine can alert you to the information you'll need for your tax appointment. And, if your tax professional doesn't have a computer yet, you might make a buck or two subcontracting these statements.

User's Notes

You should have no trouble with "Installment Sale." It's a program that I use infrequently so the user prompt messages provide all the instructions you need. (I've had one or two embarrassments when I pluck a seldom used program for a specific problem and find

An easy way
to produce
professional
quality
income tax return
attachment.

that I've forgotten how to run it. I try to produce clearer prompt messages now.)

All of the entries are on a one-prompt, one-entry basis except LOCATION (CITY, STATE) and BUYER'S ADDRESS (CITY, STATE). These are configured for two entries so you can type City (comma) State in the normal letter addressing method.

You'll be pleasantly surprised by the few entries needed to produce a professional quality income tax return attachment. In fact, the primary purpose of this program is the printing and formatting of the data in a style that approximates the old IRS worksheet. This format is pretty efficient in presenting the necessary information and not much extraneous data. You may wish to run a hard copy of the data entry prompt messages as a bookkeeping/record compiling checklist. (There can be a lot of record searching and number juggling to total all of your "improvements" to a piece of property that

Program Listing continued

```

0880 PRINT TAB(5);"(WHICHEVER IS SMALLER)";
0890 PRINT TAB(52-LEN(STR$(A(18))));"A(18)";
0900 PRINT TAB(42);"-----"
0910 PRINT "19. TOTAL CONTRACT PRICE";TAB(65-LEN(STR$(A(19))));"$ ";A(19)
0920 PRINT TAB(56);"-----"
0930 PRINT
0940 PRINT "PERCENT PROFIT (LINE 9/LINE 19)";
0950 PRINT TAB(65-LEN(STR$(P)))";P";"Z"
0960 PRINT TAB(59);"-----"
0970 PRINT :PRINT
0980 REM --HEADER FOR YEAR-TO-YEAR FOLLOW-UP
0990 PRINT "TAX YEAR ";TOTAL PAYMENT ";INTEREST ";PRINCIPAL ";
1000 PRINT "Z PROFIT ";GAIN ";DEFERRED "
1010 PRINT "ENDED ";RECEIVED ";";
1020 PRINT " ";REALIZED ";BALANCE"
1025 Z$="-----"
1030 PRINT Z$;Z$;Z$
1035 PORT=1
1040 INPUT "ANOTHER COPY",Z$
1050 IF LEFT$(Z$,1)=""Y" THEN 410
1060 END
1070 REM *THIS PROGRAM WILL CALCULATE AND PRINT*
1080 REM *A STATEMENT OF INSTALLMENT SALE THAT *
1090 REM *CAN BE ATTACHED TO STATE AND FEDERAL *
1100 REM *INCOME TAX RETURNS IN LIEU OF THE *
1110 REM *PREPRINTED FORMS THAT ARE USUALLY NOT*
1120 REM *READILY AVAILABLE. IT ALSO PROVIDES *
1130 REM *THE COLUMN HEADINGS TO ALLOW FUTURE *
1140 REM *YEAR REPORTING OF THE TAXABLE AND NON*
1150 REM *TAXABLE RECEIPTS FROM THE TRANSACTION*
1160 REM * COPYRIGHT 1979 BY W.B.GOLDSMITH, JR. *
1170 REM * LAKEWOOD, CALIFORNIA *
1180 REM * ALL RIGHTS RESERVED. *****

```

you've owned for a number of years.)

Your finished Installment Sale Statement includes the column headings for reporting annual receipts, taxable and non-taxable amounts. Since my TTY lacks graphics capability, I use a straightedge and soft tip or ball-point pen to produce the column separators (see Sample Run).

For multiple copies of a printout, type "YES" when the program asks "ANOTHER COPY?". The PRESS 'RETURN' TO PRINT feature allows me to check my TTY for paper positioning, power on, remote/local and so forth before launching an output sequence.

Installment Sale is slanted to sales of real estate since that's the usual use I have for the program. If you are reporting an installment sale of personal property, a "NOT APPLICABLE" in the LOCATION OF PROPERTY (CITY, STATE) will adapt the routine.

Understanding the Statement

The line numbers printed by the program correspond to the old IRS Worksheet. They are included to promote familiarity with the form by tax professionals. I have used this program for two and a half tax seasons in my own practice and had no complaints. While all the numbers on the paper are important, certain lines are more important than others.

Line 1, TOTAL SELLING PRICE, is the price agreed upon by buyer and seller. It is the gross, before commissions, number and is used to determine

the maximum payment that can be received in the year of sale. (To qualify for installment sale reporting, you must receive less than 30% of the selling price in the first year.)

Line 9, GAIN TO BE REALIZED, is the amount you will eventually report

the statement and on installment sale provisions, get a copy of Publication 17, *Your Federal Income Tax*, which is usually available free of charge at IRS offices.

Program Notes

Installment Sale, written in SWTP 8K Basic Version 2.0, should adapt easily to other Basics with character string and one-dimensional matrix capability. I used the subscripted variables to save some memory, but no data manipulation depends on the subscripts. You can assign other variable names that suit you without disturbing the program logic. I used the multiple statement per line feature in lines 440, 450 and 540 to squeeze in some extra PRINTs. If your Basic won't handle multi-statement lines, just add intermediate line numbers where I've used a colon (:). No program logic depends on the multi-statement feature.

While Installment Sale is straightforward, it's worth a few moments to discuss the line-by-line features. Please refer to the Program Listing.

Statements 10 and 20 are pretty self-explanatory. Line 30 suppresses an automatic CR LF feature of the SWTP interpreter and allows the program to control print formats. Lines 40 through 110 collect the header information for

Structured to translate easily into your machine's version of Basic

as income on your tax returns. You'll report a bit of this each year that you receive payments until the sale contract price has been paid.

Line 16, TOTAL INITIAL PAYMENTS IN YEAR OF SALE, is used to determine the 30% or less number, and is used to calculate how much of the gain you will report in the first year.

Line 19, TOTAL CONTRACT PRICE, is used to determine the profit ratio or how much of each year's principal payments are added to your other gross income.

PERCENT PROFIT is the real "bottom line" of the form. This number will be used each year to compute your taxable portion of the principal payments received.

Other numbers on the statement are used to derive the key figures. For more information on the accounting behind

the seller (TAXPAYER), buyer and property.

Lines 120 through 210 collect the information and compute the gain on the sale. All computations are performed by the program as soon as the needed data are collected. This early computation policy insures the availability of intermediate results for later calculations.

Lines 220 through 330 compute the initial payments received in year of sale — in non-tax talk, the down payment. For purposes of checking the 30% limitation that we discussed earlier, any mortgage assumed by the buyer that exceeds the "adjusted basis" is included in the down payment. (Adjusted basis is the cost of the property plus the cost of improvements less any depreciation you took. This is the number you use to calculate gain or

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loss for tax purposes.)

Lines 250 through 290 look at the mortgage assumed and the adjusted basis. If the mortgage is less than the adjusted basis, variable A(12) is set to zero. If the mortgage is more, A(12) will contain the value by which the mortgage exceeds the adjusted basis. Line 330 sums the pieces of the initial payment into variable A(16).

Statements 340 through 390 calculate the total contract price. Total contract price is the selling price less the smaller of the adjusted basis or the mortgage assumed. The total contract price is used to calculate the percentage profit, which is computed in Line 400. It is the gain to be realized (A(9)) divided by the total contract price (A(19)).

You may have noted by now that the subscripts on the numeric variables correspond with the line numbers on the output statement. This feature was intentional, but serves no other function than to make the program and output easy to match.

Lines 410 through 1030 handle the task of printing and formatting the statement. DIGITS=2 in line 410 specifies the number of digits following the decimal point in the printed arithmetic figures.

Line 430, PORT=3, steers the output from my video terminal to my TTY — which is my workhorse system printer. You may need to change this statement to match your own system configuration and Basic command structure. The TAB functions in the statements of lines 560 through 950 insure that all the decimal points line up. If your Basic has different print format scheme, you may be able to get away with some less complex TABs.

Line 1025 sets variable Z\$ equal to 24 dashes. In line 1030, three successive Z\$s are printed to produce a line of 72 dashes. If your printer has a width other than 72 columns, you'll need to change Z\$ to match.

Statement 1035 returns control to my Video Terminal (PORT=1) so the ANOTHER COPY? prompt doesn't appear on the income tax return attachment.

Installment Sale is a straightforward program to save you time and hassle with your income taxes if you have any involvement with installment sales. It may also help you earn a few extra dollars with your personal computer as you offer Installment Sale Reporting forms to tax practitioners. □

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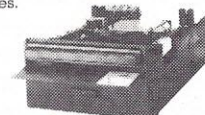
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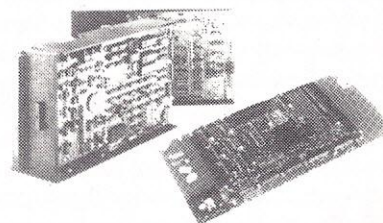
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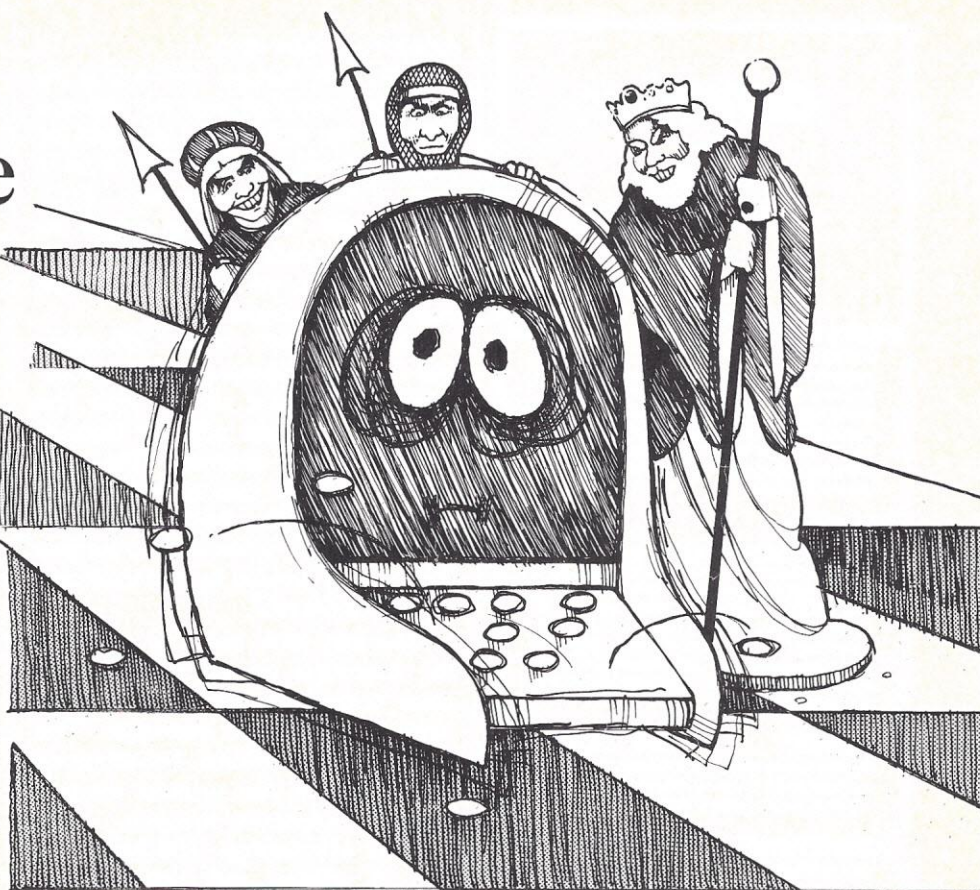
Saga of the Nervous Computer

BY BOYD Z. PALMER

Ordinarily, I would never intentionally cause mental anguish to anyone, but I must admit I feel strongly challenged by these new chess-playing computers; they appeal somehow to my baser instincts. Consequently, after I managed to beat my brother's Chess Challenger portable game during the Christmas holidays, I decided to sink my \$900 year-end bonus into a *real* computer and finally wound up with a 16K Radio-Shack TRS-80. I also purchased the Sargon II chess program, thus bringing together my dreams for both computers and chess. As with many dreams, this has proved to be a dismaying and unstable combination.

It seems impossible for non-computer, non-chess nuts to grasp the deep, albeit unreasonable, satisfaction to be found in conquering one of these computerized chess players. Even if the thing doesn't notice or even care when you cheat by taking back an errant move leading to disaster. The Sargon program in particular intimidates you by showing not just that it is thinking (via a blinking splotch on the screen), but also what move it is considering and how many combinations of moves ahead it is working out. This detail of sheer arrogance was as formidable an obstacle for me to overcome as the unfamiliar graphics and the coded notation of squares used to inform my blinking opponent what move I had finally settled on. However, the reward of satisfaction was still there, with the obstacles adding further challenges demanding total commitment to the play of the game. I feel I proved equal to the challenge. In my first three days of intense concentration, I defeated my

Mr. Palmer is currently Associate Director of the Alpha Center for Health Planning, which gives federally funded assistance to health planning agencies.



Sargon II opponent at each of the four lowest levels of difficulty (0, 1, 2 and 3) with only one move taken back when a sneaky knight trapped my queen, which had just taken an unguarded pawn. Those victories gave a tremendous satisfaction of ownership and accomplishment which none of my family or co-workers has properly appreciated.

Neophyte computer owners like myself, not fully aware of what is happening internally and thus completely baffled by the flood of new terms like "high memory" and "low memory," tend to personalize this obvious intelligence and ascribe some very human traits to its behavior. These traits do not seem male or female in nature, but there is undoubtedly a distinct personality in there somewhere. For example, as a chess opponent, the Sargon-computer combination is a very conservative and safe player — it doesn't make mistakes like leaving unguarded pawns unless there is a reason. Furthermore, the thing is doggedly persistent, and just will not resign in a hopeless position. (One game lasted 110 moves and 4 hours because I was determined to make the king turn-turtle in its mated death throes.) At the same time, there emerges a certain lack of imagination in its play, and it can actually be diverted by offering unguarded pieces on one side while you

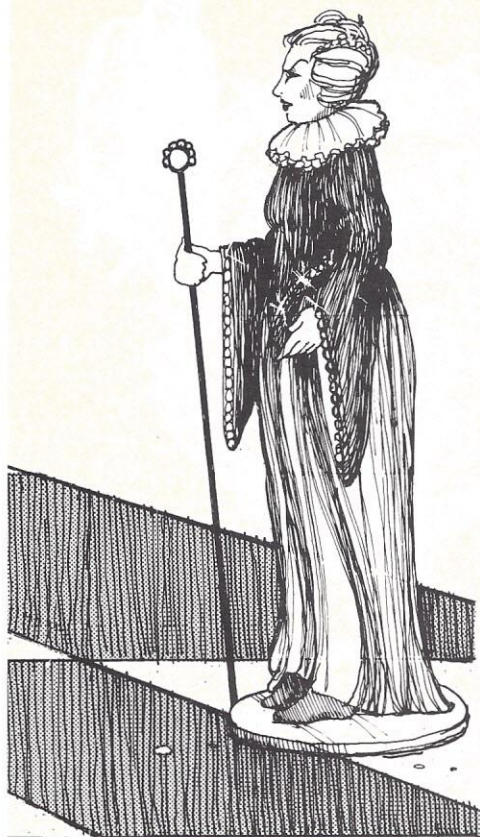
hope it hasn't noticed your powerfully developing attack on the other side.

All this is prelude to the saga of how I drove my new purchases completely and totally bananas. Literally, it suffered a serious collapse unrelated to "glitches," "slipped bits" or other esoteric problems occasionally encountered by home computers.

The breakdown began innocently enough one evening when I chose to play a Level 2 game, which meant it would take about one minute to decide on its move. Being cocky with prior success, I did not devote proper concentration to the task, but I still decided not to take inferior (or just plain careless) moves back. Consequently, two black rooks (mine had disappeared earlier in the flashing blips the screen uses to indicate moves and captures) soon checkmated my poor king. In a fit of pique, I flipped into change-mode, and added three white kings to the board without changing the mated position, then told it, "your move." Rather than announcing that I was still checkmated, my opponent went into a long and thoughtful meditation. Suddenly, the blinking splotch disappeared; obviously a multitude of kings had somehow been too much to handle, so it resorted to a catatonic withdrawal from reality as a self-preservation response.

I was quite intrigued by this development; further experimentation

Illustration by Jacky Brill



was clearly needed. I set up another situation where a black queen had two white kings in check, and I said to powerful Level 5 intelligence, "your move." Well, it was fascinating and instructive to watch the choice of moves Sargon was considering for the queen to get out of a logical impossibility according to its code of allowable actions. First it thought long and hard about retreating from the situation entirely and moving the queen so it wasn't attacking either king. Then it thought awhile about taking one king; then about taking the other. At least it hadn't gone catatonic as it had earlier. After about 45 minutes, it suddenly, and with no apparent prior thought, moved a pawn to attack one of the kings and told me I was in check, as if I hadn't been before. When I tried to move any piece on the board, I got the rather derisive command "INVALID MOVE — TRY AGAIN." Since it had the power to reject any and all of the moves, I retaliated by going back to change-mode and ordering that it was black's move. It then thought awhile, came up with a different checking move, and threw it back to me with that mocking "INVALID MOVE — TRY AGAIN" blocking any of my responses. I then went back into change-mode and told it to move.

This exchange continued until finally, the black queen flashed down and

actually took one of the white kings. I then set up a succession of situations where both kings were in checkmate position; where black had a queen but no king; where white had six kings and black had four. Before too long, Sargon began capturing these multiple kings more cavalierly, taking less and less time per move. Having once violated a fundamental rule, it seemed to get used to this forbidden action and would swoop down on exposed kings with apparent glee.

Shortly after this antisocial behavior became established, a strange square blip appeared beneath the white kings as part of the graphics. Rather alarmed, I went back to the regular set-up to play a legitimate game, figuring I might have been too vindictive. Alas, it was too late — something was terribly wrong! The graphics for two knights were broken up, the pawns had long bars across the tops, and now every piece had that tell-tale blip below it. To cap it off, my initial move, a perfectly legal king-pawn to king 4, was greeted with that now-pathetic "INVALID MOVE — TRY AGAIN!"

At that point my computer was a nervous wreck. It had been forced to deal over and over with situations which defied its moral code of internal rules and laws. While it found temporary respite by desperate attempts to make me the offending party, I relentlessly threw it back into the same psychological double-bind. Since it didn't know how to resign, it finally degenerated into a classic nervous breakdown, such that it could no longer recognize legitimate situations. I felt very guilty about the whole thing.

While I am sure others can explain what actually happened in technical computerese, to me it appeared that Sargon and the computer merged into a single entity that I had viciously attacked and confused. I was struck by the clear parallel between human behavior and that of my chess opponent, and I enthusiastically pound this analogy in when I relate this saga to any friends and acquaintances who will listen. There is possibly a rather disturbing message on treatments or cures — for example, my solution was to wipe the memory clean and start anew. I know I can be convinced that this treatment is probably inappropriate for humans, but the cause of the affliction clearly applies to us also. In any case, no one can convince me that I did not in fact drive my computer into complete collapse that long and fateful evening, and I have not tried it again since. □

By Netronics

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Video Output: 1.5 P/P into 75 ohm (EIA RS-170) • Baud Rate: 110 and 300 ASCII • Outputs: RS232-C or 20 ma. current loop • ASCII Character Set: 128 printable characters—

ASCII Character Set: 128 printable characters—
!"#\$%&'()*+,-./0123456789:;<=>?
[\] ^ _ ` { | } ~
"abcdefghijklmnopqrstuvwxyz{ }~

BAUDOT Character Set: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z - ? : * 3 \$ # () , . / 0 1 4 5 7 ; 2 / 6 8 •
Cursor Modes: Home, Backspace, Horizontal Tab, Line Feed, Vertical Tab, Carriage Return. Two special cursor sequences are provided for absolute and relative X-Y cursor addressing • Cursor Control: Erase, End of Line, Erase of Screen, Form Feed, Delete • Monitor Operation: 30 or 60Hz (jumper selectable).

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CIRCLE 18

THE FAMILY FOREST

AS THERE MAY BE SOME PEOPLE WITH THE SAME EXACT NAME, EACH PERSON HAS BEEN ASSIGNED A NUMBER FOR IDENTIFICATION

EACH PERSON IS CROSS INDEXED BY NAME AND NUMBER

WHEN THE PROGRAM STARTS, IT WILL ASK WHICH YOU WANT TO SEARCH BY, NAME OR NUMBER

DEPENDING ON YOUR ANSWER, IT WILL THEN SEARCH FOR EITHER THE NAME OR NUMBER THAT YOU ARE LOOKING FOR

IF YOU ARE UNSURE OF THE SPELLING IT WILL SEARCH & PRINT ALL FIRST NAMES STARTING WITH THE INITIAL THAT YOU INPUT

PUSH ANY KEY TO START
ADD NAMES OR SEARCH FOR DATA? ADD

THE NEXT DATA LINE TO BE TYPED IS NUMBER 1150.

TYPE DATA IN THE FORM:

1150 DATA 1150,NAME, BIRTH
1160 DATA PLACE, SPOUSE, MARRIAGE DATE
1170 DATA DIED, PLACE, CHILDREN'S #'S
1180 DATA ID NUMBER, FATHER, MOTHER

BE SURE TO SAVE DATA AFTER ENTERING

ADD NAMES OR SEARCH FOR DATA? SEARCH
SEARCH BY NAME OR NUMBER? NAME
WHAT IS THE NAME? THOMAS

```

THOMAS EDWORTHY(1)                                740
BIRTH:                                              7 JAN 19XX
PLACE:                                              MPLS MN
SPOUSE:      SHARON ELAINE ZIGAN(300)
MARRIED:      17 AUG 19XX-9 OCT 19XX
DIED:         NA
PLACE:         NA
CHILDREN'S #'S:                                1A, 1B
FATHER:      CLIFTON EDWORTHY(3)
MOTHER:      MARY ANTOINETTE RENVILLE(4)
    
```

```

THOMAS EDWORTHY(5)                                800
BIRTH:                                              UNK
PLACE:                                              UNK
SPOUSE:      ANNIE LARSON(6)
MARRIED:      UNK
DIED:         UNK
PLACE:         UNK
CHILDREN'S #'S:                                3,5A,5B,5C
FATHER:      GEORGE EDWORTHY(9)
MOTHER:      SARAH SWEET(10)
    
```

ADD NAMES OR SEARCH FOR DATA? SEARCH
SEARCH BY NAME OR NUMBER? NUMBER
WHAT IS THE NUMBER? 3

```

CLIFTON EDWORTHY                                840
BIRTH:      8 JUL 19XX
PLACE:      WALHALLA ND
SPOUSE:      MARY ANTOINETTE RENVILLE(4)
MARRIED:      UNK
DIED:      1 FEB 19XX
PLACE:      PLYMOUTH VILLAGE, MN
CHILDREN'S #'S: 3A,3B,3C,1,3D,3E,3F,3G,3H,3I,3J
FATHER:      THOMAS EDWORTHY(5)
MOTHER:      ANNIE LARSON(6)
    
```

ADD NAMES OR SEARCH FOR DATA? S
SEARCH BY NAME OR NUMBER? NU
WHAT IS THE NUMBER? 1A



—BY THOMAS EDWORTHY—

Family Forest is a simple genealogy program which does not require a floppy disk or printer. It is from Gary Greenberg's, "Phone Directory" program (December 1978 *Personal Computing*).

Some genealogy programs automatically number the new person as he/she is entered but Forest doesn't. Instead, you can use your own numbering system if it's already set up.

You can see from the sample run that children are entered by number rather than name, allowing you to enter several children. If you want their names you can search by number.

Forest has a fairly rapid access to the data once it is loaded and should be adaptable to most Basics. Although it was written for my 16K Pet, the program can be used on an 8K machine.

Program Notes

1. To conserve memory the introduction can be omitted — lines 6020 to 6150.
2. Lines 1300 to 13131 are a subroutine that shows you how to enter data.
3. Lines 12000 to 12030 are a subroutine to search for a name.
4. Lines 11000 to 11010 are a subroutine to search for a number.
5. Lines 400 to 5000 are reserved for the data statements.
6. The PRINT " " clears the screen on a Pet.
7. The "R" and the "_" as in lines 165, 6010, 6140 and so forth print the characters between them in reverse field. □

Program Listing

```

155 PRINT "I":GOTO6010
160 CLR:GOSUB13000
165 INPUT "SEARCH BY NAME OR NUMBER?":J$
170 IF LEFT$(J$,2)="NA" THEN GOSUB12000
175 IF LEFT$(J$,2)="NU" THEN GOSUB11000
180 IF J$="N" THEN 165:IF M$="END" GOTO9999
185 FOR I=1 TO 5000
190 IF A$="5000" GOTO 285
195 IF I$="5000" GOTO285
    
```

Continued

Illustration by David Bastille

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```

200 IF LEFT$(J$,2)="NU"GOTO11010
205 IF LEFT$(J$,2)="NA"GOTO12010
210 IFA$="5000"GOTO285
215 IF I$="5000"GOTO285
220 IF M$<>P$ GOTO 285
225 X=LEN(A$):GOSUB300
230 PRINTN$;"(,";I$;")";TAB(39-X);A$
235 X=LEN(B$):PRINT"BIRTH:";:PRINTTAB(39-X);B$
240 X=LEN(C$):PRINT"PLACE:";:PRINTTAB(39-X);C$
245 X=LEN(D$):PRINT"SPOUSE:";:PRINTTAB(39-X);D$
250 X=LEN(E$):PRINT"MARRIED:";:PRINTTAB(39-X);E$
255 X=LEN(F$):PRINT"DIED:";:PRINTTAB(39-X);F$
260 X=LEN(G$):PRINT"PLACE:";:PRINTTAB(39-X);G$
265 X=LEN(H$):PRINT"CHILDREN'S # 'S:";:PRINTTAB(39-X);H$
270 X=LEN(K$):PRINT"FATHER:";:PRINTTAB(39-X);K$
275 X=LEN(L$):PRINT"MOTHER:";:PRINTTAB(39-X);L$
280 GOSUB300
285 NEXT I
290 RESTORE A$="400"
295 GOTO 160
300 FOR I=1 TO 39:PRINT"-:";NEXT I:PRINT:RETURN
400 DATA 400,THOMAS EDWORTHY,7 JAN 19XX
410 DATA MPLS MN,SHARON ZIGAN,17 AUG 19XX
420 DATA NA,NA,"1A,1B"
430 DATA 1,CLIFTON EDWORTHY(3),MARY ANTOINETTE RENVILLE(4)
440 DATA 440,CLIFTON EDWORTHY,8 JUL 19XX
450 DATA WAHALLA ND,MARY ANTOINETTE RENVILLE,UNK
460 DATA 1 FEB 19XX,MEDICINE LAKE MN,"3A,3B,3C,1,3D,3E,3F,3G,3H,
3I,3J"
470 DATA 3,THOMAS EDWORTHY(5),ANNIE LARSON(6)
4960 DATA 4960,NAME,BIRTH
4970 DATA PLACE,SPOUSE,MARRIED
4980 DATA DIED,PLACE,CHILD
4990 DATA NUMBER,FATHER,MOTHER
5000 DATA5000,"ENDATA",*,*,*,*,*,*,*,*,*,5000,*,*
6010 PRINT"J":PRINTTAB(12);"THE FAMILY FOREST"
6020 PRINT:PRINT"AS THERE MAY BE SOME PEOPLE WITH THE"
6030 PRINT"SAME EXACT NAME, EACH PERSON HAS BEEN "
6040 PRINT"ASSIGNED A NUMBER FOR IDENTIFICATION":PRINT
6050 PRINT"EACH PERSON IN THIS FILE IS CROSS INDEXED BY NAME
AND NUMBER
6060 PRINT:PRINT"WHEN THE PROGRAM STARTS, IT WILL ASK "
6070 PRINT"WHICH YOU WANT TO SEARCH BY, NAME OR NUMBER"
6080 PRINT:PRINT"DEPENDING ON YOUR ANSWER, IT WILL THEN SEARCH"
6090 PRINT"FOR EITHER THE NAME OR NUMBER YOU ARE LOOKING FOR"
6100 PRINT:PRINT"IF YOU ARE UNSURE OF THE SPELLING"
6110 PRINT"IT WILL SEARCH & PRINT ALL FIRST NAMES"
6130 PRINT"STARTING WITH THE INITIAL THAT YOU INPUT"
6140 PRINT:PRINTTAB(09);"PUSH ANY KEY TO START"
6150 GET J$:IF J$=""GOTO6150
6170 PRINT"J"
6180 GOTO160
9999 END
11000 INPUT"WHAT IS THE NUMBER";M$:RETURN
11010 READ A$,N$,B$,C$,D$,E$,F$,G$,H$,I$,K$,L$:P$=I$:GOTO210
12000 INPUT"WHAT IS THE NAME";M$:RETURN
12010 READ A$,N$,B$,C$,D$,E$,F$,G$,H$,I$,K$,L$
12015 X=LEN(M$)
12020 P$=LEFT$(N$,X)
12030 GOTO210
12040 END
13000 PRINT"DO YOU WISH TO ";:ADD";" NAMES OR ";:SEARCH";
13005 INPUT " FOR DATA";Q$
13010 IF LEFT$(Q$,1)="S" THEN RETURN
13015 IF LEFT$(Q$,1)<>"A"THEN13000
13020 DIM N$(200)
13030 FOR X=1TO200
13040 READ A$,N$(X),B$,C$,D$,E$,F$,G$,H$,I$,K$,L$
13050 IF N$(X)="ENDATA"THEN13065
13060 NEXT X
13065 PRINT:PRINT
13068 Z=320+(40*X):PRINT"J"
13070 PRINT"THE NEXT DATA LINE TO BE ENTERED IS NUMBER";Z;". "
13075 PRINT:PRINT
13080 PRINT"TYPE DATA IN THE FORM:"
13085 PRINT:PRINT
13095 PRINT Z;"DATA";Z;".NAME,BIRTH"
13100 PRINT:PRINT Z+10;"DATA PLACE,SPOUSE,MARRIAGE DATE"
13110 PRINT:PRINT Z+20;"DATA DIED,PLACE,CHILDREN'S NUMBERS"
13115 PRINT:PRINT Z+30;"DATA ID NUMBER,FATHER,MOTHER"
13120 PRINT:PRINT:PRINT"IF UNKNOWN TYPE UNK INSTEAD OF THE
INFORMATION"
13130 PRINT:PRINT:PRINT"DON'T FORGET TO SAVE THE NEW DATA"
55000 END
READY.
```


Turn Your Hobby Into a Business

—BY WILLIAM R. PARKS—

Many of us microcomputer hobbyists sense the need for deriving some monetary profits from the expertise and involvement we have with home computers. We realize that even though there are many of us around, we are still a pretty select group when compared to the whole population. In other words, there are more people in our society who know nothing about computers than those who do. Consequently, our specialized knowledge can produce an auxiliary income.

This article is for the dedicated home computer buff who has developed many skills, learned programming and even knows a little about electronics — enough to make minor repairs. These talents, along with some social aptitude and a little business know-how, can form the basis for developing your very own computer business in the community you live in — a business concerned with home computing, small business computers and consulting, including programming in Basic.

There is a “natural way” to turn your home computer hobby into a small business venture that is sure to pay dividends in the years ahead. By “natural” I mean a gradual evolutionary process which requires little or no borrowing of capital funds other than what you ordinarily spend on your hobby.

My proposals should work well in environments such as small towns located in the many counties of America which have no major metropolitan population centers. Such locations offer less competition from professionals who are well capitalized and in a full-time business of selling small computers.

First, make a time commitment in which you will be available for potential small computer buyers and existing owners who require programming. One hobbyist used the classified ads of the local home town newspaper to announce that he was available to do small computer consulting (mainly amounting to programming in Basic or customizing existing software). The hobbyist concocted a name for his operation (your initials will do; e.g. W.R.P. Small Computer

Consulting). Once a month, a 2-inch classified ad alerted the community to this “new” service.

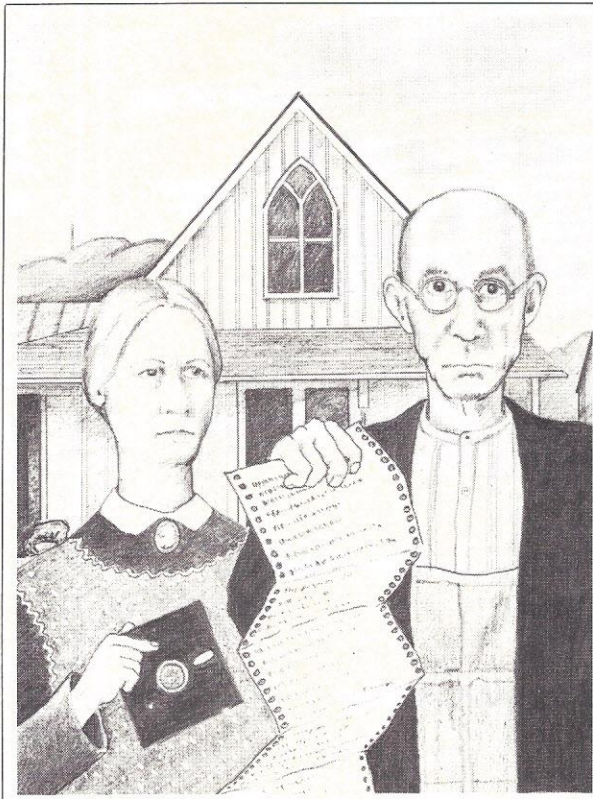
Gradually, the hobbyist developed contacts with small business operators in the community. He advised them on which microcomputer to buy. (He also wrote programs for them on a part-time basis (rates for programming on disk based systems vary from \$25 to \$50 per hour). Some businessmen hired this hobbyist as a permanent “part-time” programmer. Today, he has enough part-time jobs to equal one full time job. Besides, he does not depend on any one client because his livelihood doesn’t depend on a single employer.

This true story did not happen overnight — it took two years of advertising once per month in the local newspaper plus leg work, phone calls and patient support of potential client’s needs for information on the technical aspects. The hobbyist was able to accumulate software which he shared with his clients on a fee basis. His programs became so familiar to himself that he could customize them for almost every small business operator in town. The small business operators, in turn, were satisfied that he was doing a thorough job for them while receiving part-time wages (e.g., \$125 for one day of work per week).

This experience illustrates the natural development of a software oriented business. The hobbyist obtained programs on usual business applications — inventory, accounts receivable, payroll, etc. He was then able to customize and maintain them with various kinds of micro

computers in businesses in his community.

My second suggestion is for hobbyists who see a need for a computer store in their community. Because of the small population, such a project can’t be supported by the community. This could also apply in a community that may already have a computer store but which doesn’t carry the particular brand of hardware that the hobbyist has. There are now national distributors who sell single-unit quantities from their warehouses to tiny part-time business operators. Your home system then becomes your demonstration model for



Illustrated by Stephen C. Fischer

potential buyers. No need to order until you make a sale.

Since the selling of hardware requires demonstrations, you will have to advertise your product rather than your service as the first hobbyist did. One hobbyist set aside Saturdays, from 10:00 a.m. to 5:00 p.m., for demonstrations. He advertised in much the same way as the last hobbyist — using the classified ads. Again, you can invent a name for your one-day-per-week operation (e.g., W.R.P. Small Computer Sales Co.). Put your home system in one room of the house that has some degree of privacy. When prospective buyers ring your doorbell and walk in, the customers will not interfere with your wife's cooking or your children's TV viewing. Hang some software packages on the wall and have some magazines and books for sale. Although you really are not expecting to make lots of money from such small items.

in a home-store, it adds a nice commercial look to your business, which is selling the system you own or acquired for resale. Also, stock some disks and data cassette tapes.

One hobbyist I know, who started a computer shop at home, sold about 45 Pet computers in a rural town of about 25,000 population. In a couple of months he plans to move his store from his house to a one-room office downtown. He expects to maintain the same work hours; i.e., Thursday nights and all day Saturdays. He is even expanding his line to include another computer — Atari.

In each of these cases of successful microcomputer software and hardware businesses, no large, initial capital investment was made. There were no rents to pay because the operations were done at home. A lot of patience was required

until the name of the business became known to small business operators and to home computer buyers. Personal contact in the homes of these little computer businesses added a certain touch of integrity and sense of belonging to the community. Persistent advertising paid off much later in sales of services and hardware.

Running a home business also offers some tax advantages. In certain cases there are no special forms to fill out other than Schedule C — "Profit or Loss From Business (Sole Proprietorship)" and a one-page tax-exempt status form from the State for resale of merchandise. In some states you must

report the sales taxes collected only once per year. On Schedule C, you can deduct a portion of the utility bills, telephone (which doesn't have to be a business phone), books, magazine subscriptions and other usual types of business

expenses for advertising, depreciation of equipment, etc. Some insurance companies permit the operation of a part-time business by adding a rider to the homeowners policy. The protection is worth the expense, which is deductible.

You can even run your business from your personal checking account if you like. However, there are some advantages to having a business checking account.

In America it is easy to start a business without much capital — if it is pursued the natural, evolutionary way. Give it a good try. After two years, you can easily pull out. The only investment you will have is right in your own home. Working on Saturdays will make it possible for you to continue holding a full-time job. Someday, your hobby might be your full-time job. □

Someday, your hobby might be your full-time job.

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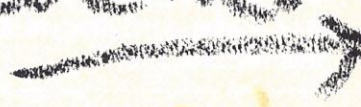
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CIRCLE 21

Computers in Education



teacher



computer



ME



Grow old along with me! The best is yet to be...

—BY KEN MAZUR—

There is a phenomenon occurring in our schools today that will affect society to a greater degree than any educational development to date. That phenomenon is the appearance of microcomputers in the classroom. While this event is still in a stage of infancy, it will march toward maturity with a speed that will astound most observers. The movement has begun and there is probably no turning back as our children discover the power and versatility a microcomputer offers the intellect.

It all sounds pretty dramatic, doesn't it? The fact is, however, that the ultimate impact of microcomputers on our futures is being "under envisioned" if anything. As the phenomenon grows older, as our students grow older, surely the best is yet to be.

Actually, the increasing proliferation of micros in the classroom is perfectly understandable if you think about it for a moment. Computers have been in schools for a number of years but until the appearance of low cost micros, the machines in schools have generally been confined to the administrative offices, at least on the secondary and elementary levels. Even the machines found in colleges that offered courses in computer science have usually been mainframes that students could utilize on a time-sharing basis.

When computers were available to students on a secondary or elementary level (a rare occurrence in the latter case), CPU time was usually confined to the brighter students.

All of this is changing however, and, as a result, our school systems will never be the same. Micros, a low-cost alternative to the mainframes of yesteryear, will change education as we know it today. Computer power will become available to students and teachers alike. Computer literacy will be as common as reading ability is today and those who are not computer literate will be at as much of a disadvantage in society as someone who can't read is today.

"Computers in education" is rather a nebulous phrase because there are so many ways that a microcomputer can apply to the concept of education. There are the formal applications such as micros in the classroom helping both teachers and students alike reach educational objectives. Micros in the home for use by parents and children is another facet and there is the actual learning about computers with the help of those very same computers. All these applications are a legitimate part of computers in education.

The most obvious role microcomputers play in education today is in the classroom where they are being used on several levels.

Teachers are finding that microcomputers can take much drudgery out of their jobs by providing help in administrative areas. Micros can help a teacher keep required records such as attendance as well as provide a constant monitoring of grades so that the status of any student is always available. No longer do teachers have to wait until the end of the grading period to determine quantitatively how well a student is doing. If a teacher wished to track a pupil's progress after each test using the old gradebook method, the teacher would have to recalculate each student's new average after each test. With a microcomputer available, all a teacher has to do

is enter the latest grade and the micro can print out (on either video display or hard copy) the average for each student — instant update!

With a micro taking over many of the clerical functions every teacher performs, that teacher will be free to provide more attention to the task of educating young minds.

Another function that a microcomputer can perform will also free up much of a teacher's time to the benefit of the students. That function is the ability to drill students in practice sessions to determine if they are achieving the necessary level of skill in a particular task. As micros take over such drills, teachers can use their time to provide specific help to those who need extra guidance. Educators will not have to teach to the greatest number in hopes of reaching the most students because students proficient in a particular subject will use a micro to proceed at a pace most suited for them while the teacher spends time with students who need help. Also, while the class practices new skills, the teacher can work individually with more gifted students to cover material that would normally be omitted because of the slower pace of a conventional classroom setting.

Even more important than the freedom and flexibility micros will give a classroom teacher is the role those same micros will play in the lives of the students.

Through a wide variety of prepackaged software (see the vendor's guide at the end of this article), students can learn or practice a wide range of subjects. Software already provides a number of methods (such as games based on specific subject matter) for learning essentially rote material. Teachers can program software for specific subjects and then turn the students loose with the machine. While the students strive to win the game they are playing, they learn the subject the teacher wishes to cover. The same software can also provide progress reports for each student so the teacher can quickly discover where a child's weak and strong areas lie.

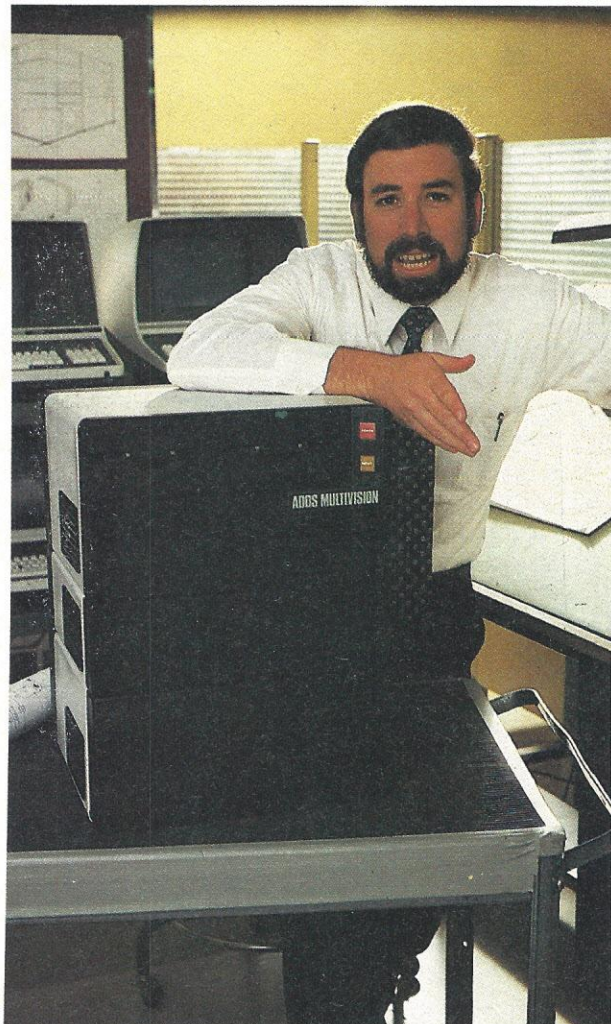
In other cases, interactive software can teach specific subjects on different levels. The lessons use interactive tutorials, graphics and even computer voice simulation to maintain student interest and reinforce basic concepts. In short, students learn without realizing that they are learning.

Beyond the teaching of recognized subject areas, microcomputers can add new dimensions to the learning process through the use of simulations. With the computational and data manipulating power of micros, students can participate in a real-life simulation where many factors must be judged to achieve certain goals. Simulations can involve everything from political, economic and social decisions to simulations of high school and college level science experiments that allow students to discover basic scientific principles without the need for costly lab equipment that may be too complex for students at a particular level.

As anyone who has ever watched a young person working with a microcomputer can relate, children quickly reach the point where they wish to program some of their own ideas and concepts into the micro. This leads to another benefit to be derived from having these powerful machines available to students — learning to program.

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Programming a microcomputer to perform a specific task requires two things: a complete understanding of the principles of the subject to be programmed; and an understanding of the computer's specific language requirements. What better way to be sure a student really understands the underlying concepts of a subject than to have that student program the machine to solve problems in that area. To do the programming, a student must know the logic necessary to solve each problem in that category. Computers work through logic and the act of programming forces a student to think clearly and logically.

Advantages of using microcomputers in an educational setting will not be confined to the classroom, however. The machines will also influence the development of those students in their own homes. Students will eventually be able to take home tapes or disks so that they can practice and sharpen specific skills at home. They will return to school the next day with their progress contained on the tape or disk for review by the teacher.

An even greater benefit for society will result from young people learning to use computers as problem solving tools for any area of interest. As students become exposed to how micros can be used in all subject areas, they will begin to apply that knowledge to dealing with matters outside of the school's curriculum. With increasing computer literacy, students will turn the power of the micro loose on areas of their own interests. Ultimately, the real impact of micros on society will rest with their use as problem solving tools by people who can fully utilize the machines' data manipulation capabilities.

There may be an added benefit to the use of micros by youngsters as well: uniting both parents and offspring to solve real-life problems the family experiences. It is possible that expressions such as "You're just too young to understand" may change to "Johnny, daddy has a decision to make. Do you think you could program the computer to help me?" Explaining the process of what is involved in making a good decision will benefit the family two ways: it will entail full and detailed communication between the generations and it will help Johnny understand some of the real-life dynamics his parents have to face each day. Explaining a subject in such a detailed manner that it can be programmed may also help parents see more clearly what factors are involved in their daily decisions.

While classroom use of micros is developing rapidly, there is still a lot of ground to be covered before the most benefit is derived. Many more micros must be distributed to school systems and educational software must continue to be developed for many subject areas. While a considerable amount of software is being marketed, much more must be designed.

One aspect of micros in education has been around for some time and is probably more developed than the applications discussed so far. It is the learning about computers themselves.

Today, people learn about computers from many sources: self-teaching books and magazines; courses about computers designed to run on those same computers; and formal institutional instruction.

For persons who wish to teach themselves at their own pace, there are many books that cover every aspect of the microcomputer field, from digital logic circuitry to programming techniques in high level languages and everything in between. Magazines such as *Personal Computing* provide specific programming techniques, ready to use applications and social insights as to how others are using micros.

On a different level, there are courses that you can actually

use with a micro to learn more about that micro. Such courses may cover anything from assembly language programming (in which the video display and audio tapes guide you through step-by-step instruction) to high level language programming which also uses the audio and visual capabilities of the micro to help you understand the machine itself.

You can also learn about microcomputer technology through kits which take you step by step through building a microcomputer or through some integral part of computer operation. Kits, which feature both hardware components and printed instructions or manuals, are available from a number of sources.

Formal computer instruction comes from a variety of sources these days. Many colleges have general computer courses which explain the principles of the machines or which deal with a particular aspect such as programming.

For those too young to attend college (or some high schools) or for those who cannot attend college on a semester basis, there are other alternatives such as summer camps for youngsters that give instruction in the use of micros between regular school sessions.

On more advanced level, some institutions of higher learning offer summer courses (such as the one at Wesleyan University in Connecticut) that let students work with main-frame machines, minicomputers and a number of different micros. The course, given over a period of six intensive weeks (seven days a week, 24 hours a day), is structured so that each student learns about the aspect of the computer field most interesting to him or her.

Sheriden College in Ontario, Canada, is even offering an entire program in microcomputer management. A two-year course beginning in September, it gives its graduates detailed knowledge of business practices, accounting and word processing with micros. In addition, students will be able to design overall accounting and record keeping systems using microcomputers.

Whatever your personal feeling about the impact of computers on society, one fact remains: microcomputers are showing up in schools and the trend is just beginning. Teachers are coming forth to promote the advantages micros bring to the classroom. In April, the National Council of Teachers of Mathematics released a set of policy recommendations for school mathematics in the 80s. Among specific recommendations were:

"That schools take full advantage of the power of computers and calculators at all levels. School administrators should consider these tools as essential as any resources, including textbooks.

"That every student have course work in using computers and in general computer literacy."

At this stage of development, micros are relatively new in the educational setting but manufacturers are actively involved in changing that. Apple Computer has pursued a policy of developing configurations for its micros that work well in the classroom and in making its products available to school systems, as are Commodore Business Machines with its Pets and Tandy Corp. with the TRS-80.

The flow of microcomputer technology into our schools has just begun and will realize its full potential only when we reach a stage where micros are no longer a novelty in the classroom but are accorded no more special consideration than a typewriter is today. When micros cease to be considered computers and become just one more tool to be used by the human intellect, we will all receive the greatest benefit from the power they offer.

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□

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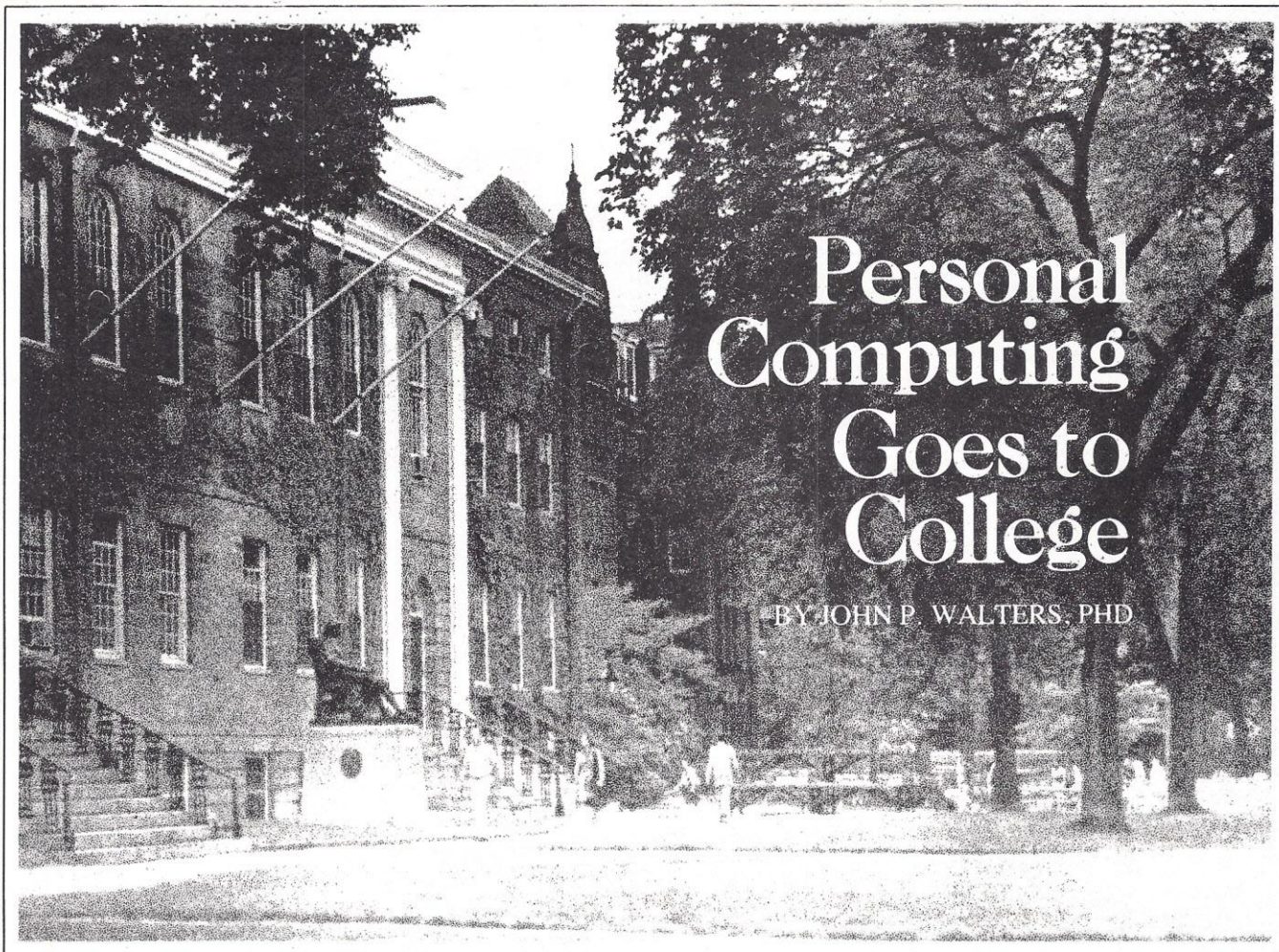
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Personal Computing Goes to College

BY JOHN P. WALTERS, PHD

While many of my students know how to code, few know how to *create* a program to solve a problem. And even fewer know how to *use* a program creatively to enhance their own personal knowledge. Personal computing has yet to affect the university at anywhere near the level it has in business or home.

I suspect this trend arises because we teach programming languages, not programming, which is analogous to teaching English without concurrent courses in literature, speech and writing. Also, few professors incorporate programs and computers into their courses as routine problem-solving tools. Some teachers feel that using a computer in their courses would require them to create "courseware," followed by the lengthy, and often professionally risky, development of a program in "computer-assisted instruction." Perhaps; but such an attitude offers no absolute advantages.

Personal Programming

However, an alternate method has been used in some engineering schools with large mainframe machines: Computer problems are incorporated into an individual course calendar. Simply put, the teacher uses intuition, experience and imagination to form realistic yet provocative problems that lend themselves to solution or exploration using a computer program, and then (gulp!) "lets the kids go!" During my student days, machines were so big and access so difficult or limited that only the toughest courses used the approach.

But today personal computing offers a new and easily available alternative for teachers. "Personal" computing

means that the emphasis on computer use in class is on programming, not on using pre-programmed instructional packages, and on *using* personal programs as tools to solve assigned problems. Programming and using are allowed to occur in a thoroughly individualized and personal manner. Instruction in how to program, per se, is not the objective, although it is not prohibited. Personal computing on technical problems is the objective, and is encouraged.

My own experience in teaching with computers has been in a chemistry course called "Chemical Instrumentation and Analysis." However, you don't need a technical context to support personal computing. It can occur in any area, and, I suspect, pretty much at any level. Programming can be learned with remarkable ease by anyone who believes they can learn it. Thus, problem solving with personalized programs can now come back to the campus from the home, to help in personalized teaching.

Simulation Problems

The problems and programs that I have explored are simulations designed to mimic a chemical instrument (or one of its components) or a situation in which the instrument is used to assist in a chemical analysis. The mimicry is usually more "academic" than "real," simply because it's an immense task to generate a wholly accurate simulation. But, since one purpose of the problems is to sequentially teach how instrument parts and components combine with chemical principles to produce a net result (synergy, if you will), an academic solution is precisely in order. The correct functionality between key variables is most important, followed by a reasonable parallel between the results from the simulation and what is currently accepted as the real answer.

Dr. Walters is Professor of Chemistry at the University of Wisconsin-Madison.

Photograph by Dan Elicona

Problem Preparation

I prepare simulation problems by first recalling from my study, research and practical experience those situations that gave me "hard-won knowledge." From these, I imagine a simpler situation and write out a tractable solution to a part of that situation. From the solution, I stipulate a problem. Then I use my own computer to prepare a personal program that will give me the kind of information I personally like to use in solving the problem or exploring the situation. I write the problem out in an informal but professional manner, and simply append my undocumented program and a sample run for benchmark guidance.

I take some pains to make my programs straightforward so they can be easily read. But I give credit for solving the problem with a program that is sufficiently different from anyone else's (including mine) to show the student's own way of thinking.

There are no answers handed out with the problems. I allow a range of acceptable answers, replacing the concept of a correct answer with one that is sensible. To assist students in evaluating their work, I post, and occasionally circulate, work from others in the class if it has good teaching value.

Particularly important to me, both as an individual and as a teacher, is to encourage as much individuality in working out the simulation problems as I perceive my students will need to solve equivalent problems after they graduate. In other words, lots. I'm sensitive to the paradox of failing to succeed in life by succeeding to please in school, and this helps form my style of problem posing. In practice, only a few students attempt to pirate my software, while most, delightfully, use it as a target to "blow out of the water" with their own work.

Problem Execution

I also find it important *not* to require that a particular type of computer or computer language be used in working the simulation. Actually, the problems can all be solved to a satisfactory degree with a pocket calculator and well-organized formulas. But it is very much a part of the intended adventure to hunt down some type of machine, learn enough about it to master its use, and then *use* it.

I share the delight that many of my students experience when they discover just how much computing power is hidden in a "hobby" computer, but I also encourage them to work in batch mode on the large mainframe machine at our computing center. The main objective is to personalize the computing first, and then the computer.

To assist novices, I require Eugene Barnett's very readable book, *Programming Time-Shared Computers in Basic*, (Wiley-Interscience) and weave reading assignments from it into the first two weeks of class. I also open up the microcomputers used in the laboratory part of the course to problem solving. But these techniques are just to get things started. My students soon fan out all over campus in finding a machine they like, and write code in Basic, Fortran and sundry programmable-calculator languages.

While you may think such non-standardization would make grading difficult, I avoid grading programs altogether by focusing on evaluating the results of *using* the program, however it is written or structured. If a program is badly written, its debugging becomes a burden and its use awkward. Good programming practices evolve and, like morals, legislate poorly. But the *use* of the program may be judged in the context of the chemical problem posed, and that kind of grading becomes a pleasure as each individual's ideas unfold through unique programs.

Examples of Simulation Problems

Here's a selection of simulation problems Dr. Walters uses in his Chemical Instrumentation and Analysis class. While these problems relate to a specific course, they illustrate how real-world situations can be simplified to create suitable computer problems.

These simulations are in various stages of development. The number of points indicates maximum credit given for completing the simulation on time and in a satisfactory manner (see main text). The number of days indicates the time from completion of lecture discussion of relevant theory until the problem is due.

Generate a table of resistor, capacitor and generator voltages as a function of time in a sinusoidally-driven, series RC circuit. (5 points, 13 days)

Illustrate one effect of correcting a simulated pH titration of a weak polyprotic acid with a strong base for solution ionic strength and ion activity by comparison with experiment. (5 points, 12 days)

Show some of the relationships between the capillary constants and the polarographic, diffusion-controlled limiting current of a polarographic wave obtained with a dropping mercury electrode.

Show how to prepare pleasingly arranged data tables for commercial marketing to replace the dual-scale conversions on analog meter faces (here, % transmission to absorbance). (5 points, 8 days)

Test a set of atomic absorption data to determine if they conform sufficiently to a linear working curve to conclude that the instrument producing them is working within specification. (10 points, 9 days)

Emulate an analog-to-digital converter or digitizer for writing onto cassette or disk the absorbance values as a function of wavelength from a synthetic absorption spectrum. (5 points, 7 days)

Illustrate the use of cross-correlation between an unknown mass spectrum and a set of standard fragmentation pattern masks to accomplish a qualitative analysis. (5 points, 5 days)

Grading

Introducing simulation problems into a college course should be done in perspective. I find it important to offer reasonable amounts of freedom in choosing how many and which simulations to work on, as well as freedom in choosing when to blend them in with more traditional "problem sets" found in texts. I offer about twice the number of simulation problems and textbook problem sets that I expect a student to work, and then simply let each person choose between the two groups of assignments as they will. I set a maximum number of points that can be accumulated in each category, and weight the simulation problems with an individual point credit commensurate with their importance to the course content and my estimate of their programming difficulty. The accumulated point total balances the total that can be achieved on two traditional examinations, one for textbook and one for computer problems. The balance appears to work

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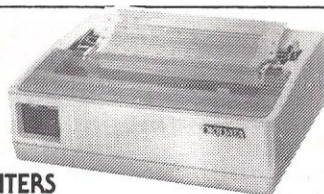
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well, but such devices are always in change and my comments here must be taken as a report on a present practice rather than an advocated procedure.

Rewards

Some exciting discoveries await professors who bring personal and free computing into traditional lecture courses. Some may be pleasant, and some distressing.

First, the bad news. Few schools seem willing to give their professors personal computers to create computer problems for their courses ("What if everyone did it?"). Your initiative and expense (as well as computing) must be personal.

Then, it's difficult to protect your programs, other than by personal copyright — which again usually requires personal expense. The time invested may (depending on your department) be judged negatively, since there will likely be little notoriety or revenue associated with the effort.

Finally, other groups may view your effort as teaching computer programming and consider it an invasion of territorial rights. But the immense impact of Basic and the personal computer has dulled this last potential bite, so it will probably be little more than a verbal snipe if anything.

On the plus side, get ready to smile. Freedom abounds, and in a way that seems too good to be true in our well-regulated lives. I suspect you'll find that by giving your students freedom to play, you will start playing as well, and love every minute of it.

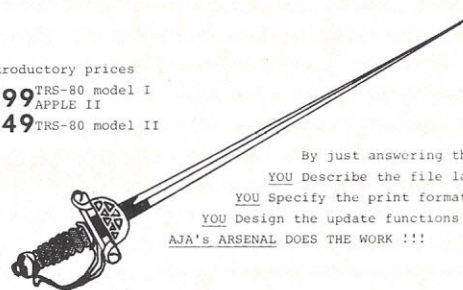
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*Program descriptions for the APPLE II ARSENAL differ slightly.

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You'll find yourself asking, once again, "I wonder what would happen if . . . ?" without checking the question first for its maturity or acceptability. And this honesty and joy of discovery will follow you into the classroom. Be careful! Your students may think there's something wrong with you.

With some time and participation, I suspect your students will discover that they can use any computer, any language, or any method they want to solve simulation problems successfully. As they make this discovery, they'll also discover an irresistible urge to explain their program or approach. And, fortunately for us all, the chances are good to excellent that they will choose one another to talk to.

The hostility, personal competitiveness and selfish isolation that so often accompany college learning just cannot stand up to the thrill of comparing notes. Instead of outsmarting each other, each student can outsmart the machine, which is just the right role for this type of personification to take.

An astonishing thing accompanies this type of person-to-person teaching. Retention skyrockets, enthusiasm builds, scholarly ideas surface, timidity fades as creativity grows and, bless us all, personal learning accompanies understanding. As a teacher, I predict that what you will enjoy most about these results will be their delightful high visibility.

Ten years ago, I told one of my sophomore classes that while they were still in school sophisticated calculators would become as affordable as a good slide rule. Last week, in a corner store, I bought a full-dress engineering calculator with complete statistical capability for the same \$24.95 my Post log-log duplex slide rule cost me in 1956.

My advice today to students is: "Keep your eyes open — it's happening now." To teachers it's: "Let the kids go!" Indeed, now is an exciting time to be either studying or teaching as personal computing goes to college. □

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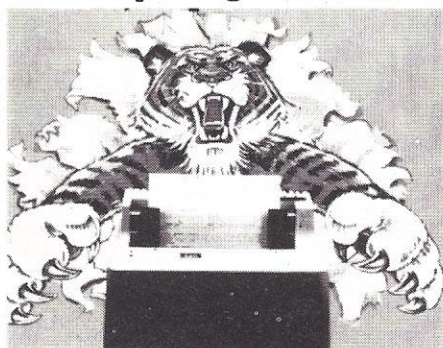
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CIRCLE 26

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Robert Lafore, writer, columnist, and programmer, has created a series of works in Interactive Fiction. Each is available on a 5¼" diskette for use on a TRS-80* Level-II with at least 32K memory and one disk drive. Requires user to have a copy of TRSDOS 2.2 or 2.3.

Six Micro Stories offers a good introduction to Interactive Fiction. Six very short stories involve you, the reader, in a variety of situations: you are an American spy in Hitler's Third Reich, the pilot of a doomed 747, and more.

Local Call for Death is a detective story in the style of Lord Peter Wimsey. Considerably more challenging than the above program, this one will put your analytic skills (and social savoir-faire) to the test.

Two Heads of the Coin is a psychological mystery set in the London of Sherlock Holmes. Most challenging of all, this program will tax your observational skills and above all your imagination.

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CIRCLE 27

A Teacher for Your Apple

—BY ROBERT R. DERNER—

One of my hardest subjects in school was history. I had great difficulty remembering dates, famous battles, geographical data and so forth. Then I discovered a very simple but effective concept — flash cards. By writing key words on the front of 3 × 5 file cards and the corresponding date, event or definition on the back, I could plant data in my brain rather effortlessly, just by flipping through the cards. My grades improved, even though my

fondness for history never did.

I've used the flash card concept in this program, including a painless method for testing what has been learned.

In the learning mode, Compututor will display a word on the screen, give you an instant for recognition, and then, for a predetermined length of time, display the word's definition. This process will continue for as long as you wish.

Switching to the testing mode lets you determine your progress by taking a multiple choice exam. The program selects 20 words and displays them one at a time with a set of possible definitions. You have two chances to pick the best definition. The computer tells you if your answer is correct. At the end of the exam, you receive a grade and an indication of how well your studying has progressed.

This painless system can help stu-

Program Listing

```
1 REM COMPUTUTOR FOR 16K APPLE II
  IN INTEGER BASIC
5 N=50: REM      INSERT TOTAL ITEM
  S IN LIST AT 1000
10 CALL -936: REM  CLEAR SCREEN
15 UTAB 5: REM  SET VERTICAL TAB
20 PRINT "      COMPUTUTOR"

25 UTAB 11
30 PRINT "PROGRAM #1"
35 UTAB 13
40 PRINT "GENERAL NOUNS"
45 UTAB 18
50 PRINT "COPYRIGHT (C) 1979, ROBER
  T R. DERNER"
55 FOR DELAY=1 TO 3000: NEXT DELAY
100 CALL -936: REM  START OF OPTIO
  N SELECT MODULE
105 UTAB 5
110 PRINT "THIS PROGRAM PROVIDES THE
  MEANS FOR"
115 PRINT "IMPROVING YOUR VOCABULARY
  OR TESTING"
120 PRINT "YOUR PRESENT PROFICIENCY.
  "
125 UTAB 16
130 PRINT "PLEASE SELECT EITHER STUD
  Y OR TEST."
135 UTAB 19: TAB 13
140 PRINT "<TYPE S OR T>"
145 P= PEEK (-16384): REM  TEST TO
  SEE IF KEY WAS PRESSED
150 IF P<211 THEN 145: REM  S OR T
155 IF P>212 THEN 145: REM  ONLY
160 POKE -16368,0: REM  CLEARS KEYBO
  ARD FOR NEXT INPUT
165 IF P=212 THEN 500
200 CALL -936: REM  START OF STUDY
  MODULE
205 UTAB 5
210 PRINT "AT WHAT RATE DO YOU WANT
  THE WORDS AND"
215 PRINT "DEFINITIONS TO FLASH ON T
  HE SCREEN?"
220 UTAB 10: TAB 13
225 PRINT "A.  5 SECONDS"
230 TAB 13
235 PRINT "B.  10 SECONDS"
240 TAB 13
245 PRINT "C.  15 SECONDS"
250 TAB 13
255 PRINT "D.  20 SECONDS"
260 UTAB 19: TAB 11
```

```
265 PRINT "<TYPE A, B, C OR D>"
270 P= PEEK (-16384)
275 IF P<193 THEN 270
280 IF P>196 THEN 270
285 T=P-192
290 POKE -16368,0
295 CALL -936
300 FOR Z=1 TO N
305 UTAB 5: TAB 10
310 GOSUB 1000+Z
315 FOR DELAY=1 TO 1000: NEXT DELAY
320 UTAB 10: TAB 12
325 GOSUB 2000+Z
330 FOR DELAY=1 TO 3000+T: NEXT
  DELAY
335 P= PEEK (-16384): POKE -16368
  ,0
340 IF P>127 THEN 100: REM  GOTO OP
  TION MODULE IF ANY KEY WAS PRESS
  ED
342 CALL -936
345 NEXT Z
350 GOTO 295: REM  RECYCLES UNTIL A
  KEY IS PRESSED
500 CALL -936: REM  START OF TEST M
  ODULE
505 UTAB 5
510 PRINT "YOU WILL BE GIVEN A SERIE
  S OF 20"
515 PRINT "MULTIPLE CHOICE QUESTIONS
  .  PICK THE"
520 PRINT "BEST DEFINITION FOR EACH
  WORD SHOWN."
525 PRINT "SELECT CAREFULLY BECAUSE
  YOU ARE BEING"
530 PRINT "GRADED ON THIS TEST!"

535 UTAB 15
540 PRINT "PLEASE SELECT THE NUMBER
  OF POSSIBLE"
545 PRINT "CHOICES THAT YOU WANT FOR
  EACH WORD."
550 UTAB 19: TAB 12
555 PRINT "<TYPE 3, 4 OR 5>"
560 P= PEEK (-16384)
565 IF P<179 THEN 560
570 IF P>181 THEN 560
575 C=P-176: REM  C=3,4 OR 5
580 POKE -16368,0
585 CALL -936
590 UTAB 20: TAB 15
595 PRINT "GOOD LUCK!"
600 FOR DELAY=1 TO 1000: NEXT DELAY
605 CALL -936
610 W= RND (N)+1: REM  W=WORD LOCATION
```

```
615 S=0: REM  S=SCORE
620 FOR Y=1 TO 20
625 UTAB 2: TAB 10
630 PRINT "WORD ";Y;" - ";
635 GOSUB 1000+W
640 L= RND (C)+1: REM  LOCATION OF
  RIGHT ANSWER
645 UTAB 10
650 FOR Z=1 TO C
655 IF L#Z THEN 660
656 PRINT Z;" "; GOSUB 2000+H
657 GOTO 680
660 LW= RND (5)+1+W+5*Z: REM  WRONG
  DEFINITION FETCH
665 IF LW>N THEN LW=LW-N
670 PRINT Z;" ";
675 GOSUB 2000+LW
680 PRINT
685 NEXT Z
690 UTAB 23: TAB 11
695 PRINT "CHOOSE YOUR ANSWER"
700 GOSUB 950
705 IF P=L THEN 900
710 UTAB 7+2*P
715 CALL -868: REM  CLEAR THIS LINE

720 UTAB 23: TAB 8
725 PRINT "WRONG ANSWER!  TRY AGAIN.
  "
730 GOSUB 950
735 IF P=L THEN 920
740 UTAB 7+2*P
745 CALL -868
750 UTAB 21: CALL -958
755 PRINT "WRONG ANSWER!  THE CORREC
  T ANSWER IS"
760 PRINT : TAB 10
765 PRINT L;" ";
770 GOSUB 2000+H
775 FOR DELAY=1 TO 3000: NEXT DELAY
780 W=W+ RND (N/12)+1: IF W>N THEN
  W=W-N
785 CALL -936: NEXT Y
800 CALL -936: REM  START OF SCORE
  AND EVAL MODULE
805 UTAB 5
810 PRINT "YOUR SCORE IS ";S;" %."

815 UTAB 20
820 IF S=100 THEN 850
825 IF S>89 THEN 860
830 IF S>79 THEN 870
835 IF S>69 THEN 880
840 GOSUB 890
845 P= PEEK (-16384)
846 IF P<127 THEN 845
```


dents of all ages studying everything from anatomy to zoology, including some foreign languages.

The study portion of the program begins at line 200. A cycling rate is selected and then a word is displayed from the word list beginning at line 1000. After a short delay, the corresponding definition is displayed from the definition list beginning at line 2000. The program progresses down the lists until interrupted (line 340) by pressing any key. Simple!

The test mode begins at line 500. You can make the test easier or more difficult by selecting the number of possible answers for each question. A word is selected at random from the word list (line 610) and displayed (line 635). A location, L, is selected at random for the position of the correct answer (line 640). Possible answers are

then displayed. Wrong answers are selected from the definition list by line 660. The right answer is displayed when position L is reached (line 656). You are then asked to choose your answer and are awarded 5 points for a correct answer on the first try and 2 points on the second try. If you don't get the answer in 2 tries, the program tells you what the correct answer is.

Line 780 selects the next word to give you a good sampling from the list without much chance of selecting the same word twice. Wrong answers are selected in much the same way, making certain that the correct answer is not selected by accident. After the 20-word test, the score and evaluation module (line 800) lets you know if you need more study or if you should proceed to another series of words.

Now that you have the basic Com-

putator program, it's a simple matter to modify the word and definition lists to meet your own needs. Although written in Integer Basic for the Apple II, the program contains no special graphics or sound routines so it should be easy to adapt to any computer with a CRT display.

A 16K Apple II accomodates lists of 300 words or more. (The Apple converts the PRINT and RETURN commands into one byte special characters, thereby considerably increasing memory efficiency.)

When modifying or adding to the word list, make sure that the accompanying definition is placed in the same position in the definition list and that all words fall into a related category (such as all nouns, etc.) so that the multiple choices in the test routine will be appropriate. □

```

847 GOTO 100
850 PRINT "CONGRATULATIONS! YOU GOT
      A PERFECT"
855 PRINT "SCORE.": GOTO 845
860 PRINT "NOT BAD! JUST A LITTLE M
      ORE STUDY AND"
865 PRINT "YOU'LL BE AN EXPERT."
      : GOTO 845
870 PRINT "I KNOW YOU CAN DO BETTER
      THAN THAT IF"
875 PRINT "YOU STUDY A LITTLE MORE!"
      : GOTO 845
880 PRINT "NOT A VERY GOOD SCORE! Y
      OU BETTER"
885 PRINT "STUDY SOME MORE.": GOTO
      845
890 PRINT "ARE YOU SURE YOU STUDIED
      FOR THIS TEST?"
895 PRINT "YOU HAVE A LONG WAY TO GO
      !": RETURN
900 VTAB 10: REM RIGHT ANSWER ROUT
      INE
901 CALL -950: REM CLEAR ANSWER TAB
      LE
902 PRINT L;" ";
903 GOSUB 2000+H
904 VTAB 23: TAB 8
905 PRINT "YOUR ANSWER IS CORRECT!"
906 S=S+5: REM ADVANCE SCORE
907 GOTO 775
910 PRINT Z;" ";: GOSUB 2000+H
911 GOTO 830
920 VTAB 10: REM RIGHT ANSWER ON 2
      ND TRY ROUTINE
921 CALL -950
922 PRINT L;" ";
923 GOSUB 2000+H
924 VTAB 19: TAB 3
925 PRINT "THIS TIME YOUR ANSWER IS
      CORRECT!"
926 S=S+2: REM ADVANCE SCORE
927 GOTO 775
930 P=PEEK (-16384): REM ANSWER
      FETCH SUBROUTINE
931 IF P<177 THEN 950
932 IF P>176+C THEN 950
933 POKE -16368,P
934 P=P-176
935 RETURN
1000 REM START OF WORD LIST
1001 PRINT "PROBOSCIS": RETURN
1002 PRINT "MALCONTENT": RETURN
1003 PRINT "HEARD": RETURN
1004 PRINT "BURSAR": RETURN
1005 PRINT "VATICINATION": RETURN

```

```

1006 PRINT "HOROLOGIST": RETURN
1007 PRINT "RENCONTRE": RETURN
1008 PRINT "POLEMIC": RETURN
1009 PRINT "TOGGERY": RETURN
1010 PRINT "FUNDAMENT": RETURN
1011 PRINT "DIDACTICS": RETURN
1012 PRINT "JOYANCE": RETURN
1013 PRINT "NEVUS": RETURN
1014 PRINT "PROGNOSTIC": RETURN
1015 PRINT "SPLORE": RETURN
1016 PRINT "ONUS": RETURN
1017 PRINT "MULTIFORMITY": RETURN
1018 PRINT "ADMONITION": RETURN
1019 PRINT "CLAMOR": RETURN
1020 PRINT "PROGENITOR": RETURN
1021 PRINT "COMPENDIUM": RETURN
1022 PRINT "DOGMA": RETURN
1023 PRINT "SPOOR": RETURN
1024 PRINT "CONTAGION": RETURN
1025 PRINT "EDIFICE": RETURN
1026 PRINT "BUFFOON": RETURN
1027 PRINT "PERTURBATION": RETURN
1028 PRINT "ALACRITY": RETURN
1029 PRINT "CONCORD": RETURN
1030 PRINT "ENIGMA": RETURN
1031 PRINT "PINNACLE": RETURN
1032 PRINT "ANECDOTE": RETURN
1033 PRINT "CORPULENCE": RETURN
1034 PRINT "ENMITY": RETURN
1035 PRINT "DOHER": RETURN
1036 PRINT "ARDOR": RETURN
1037 PRINT "CIRCUMLOCUTION": RETURN
1038 PRINT "DICTUM": RETURN
1039 PRINT "AUDACITY": RETURN
1040 PRINT "DISDAIN": RETURN
1041 PRINT "EQUIVOCATION": RETURN
1042 PRINT "FISSURE": RETURN
1043 PRINT "CESSATION": RETURN
1044 PRINT "BOMBAST": RETURN
1045 PRINT "DISSUASION": RETURN
1046 PRINT "EQUANIMITY": RETURN
1047 PRINT "GIRTH": RETURN
1048 PRINT "EPICURE": RETURN
1049 PRINT "CHRONICLE": RETURN
1050 PRINT "DISCORD": RETURN

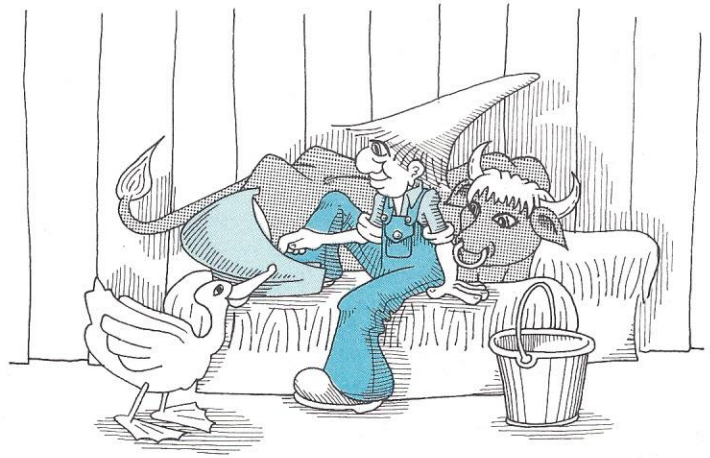
```

```

2000 REM START OF DEFINITION LIST
2001 PRINT "NOSE": RETURN
2002 PRINT "REBEL": RETURN
2003 PRINT "FOREST": RETURN
2004 PRINT "TREASURER": RETURN
2005 PRINT "PREDICTION": RETURN
2006 PRINT "MAKER OF CLOCKS": RETURN
2007 PRINT "COMBAT": RETURN
2008 PRINT "DISPUTANT": RETURN
2009 PRINT "CLOTHING": RETURN
2010 PRINT "UNDERLYING PRINCIPLE"
      : RETURN
2011 PRINT "INSTRUCTION": RETURN
2012 PRINT "DELIGHT": RETURN
2013 PRINT "BIRTHMARK": RETURN
2014 PRINT "PROPHECY": RETURN
2015 PRINT "COMMOTION": RETURN
2016 PRINT "BURDEN": RETURN
2017 PRINT "VARIETY": RETURN
2018 PRINT "HARNING": RETURN
2019 PRINT "OUTCRY": RETURN
2020 PRINT "ANCESTOR": RETURN
2021 PRINT "SUMMARY": RETURN
2022 PRINT "DOCTRINE": RETURN
2023 PRINT "TRAIL": RETURN
2024 PRINT "INFECTION": RETURN
2025 PRINT "BUILDING": RETURN
2026 PRINT "CLOWN": RETURN
2027 PRINT "HORRY": RETURN
2028 PRINT "PROMPTNESS": RETURN
2029 PRINT "HARMONY": RETURN
2030 PRINT "RIDDLE": RETURN
2031 PRINT "SUMMIT": RETURN
2032 PRINT "TALE": RETURN
2033 PRINT "OBESITY": RETURN
2034 PRINT "HATE": RETURN
2035 PRINT "INHERITANCE": RETURN
2036 PRINT "PASSION": RETURN
2037 PRINT "HORDINESS": RETURN
2038 PRINT "SAYING": RETURN
2039 PRINT "BOLDNESS": RETURN
2040 PRINT "SCORN": RETURN
2041 PRINT "DECEPTION": RETURN
2042 PRINT "OPENING": RETURN
2043 PRINT "STOPPAGE": RETURN
2044 PRINT "BOASTING": RETURN
2045 PRINT "DISCOURAGEMENT": RETURN
2046 PRINT "CALMHNESS": RETURN
2047 PRINT "OUTLINE": RETURN
2048 PRINT "GOURMET": RETURN
2049 PRINT "ACCOUNT": RETURN
2050 PRINT "DISAGREEMENT": RETURN

```


Living Off the Land



BY ROBERT K. FINK

Children often hold unrealistic concepts of investments. Their first impression is that you simply put your money into "something" and wait for the results! When youngsters begin learning the techniques of investing their "capital" in real-world situations, they usually don't realize that not only is their cash at stake, but there are many other constraints such as time and space.

Kids who are challenged to "beat" an economic simulation based only on available cash soon feel they are simply playing against the dice.

If you've tried to write challenging economic simulations for young students, you've probably noted that any game or instructional routine that performs an automatic dice roll for them will soon lose their interest. How can you improve your efforts?

First, any simulation must have more than one parameter for selection. Students must be confronted with the real-world fact that many constraints operate at cross purposes at all times. Any business simulation must not only offer them a choice of investing a maximum amount of money, but must emphasize that only so much space and time are available.

Also, simple random payoffs will lead them to believe that life is just one continuous "craps game" without even the slightest chance at some control. To emphasize the effect of planning on payoffs, students can be required to research past trends shown by the situation and then relate these trends to their investment choices.

Robert Fink is a professor in the Engineering Technology department of Sinclair Community College in Dayton, OH.

Sample Run

PRODUCT	PER ACRE	# OF ACRES USED	TOTAL SPENT	INVESTMENT RETURNED	GROSS INCOME
CORN	\$10	X 10	\$ 100	TRP'LD	\$ 300
WHEAT	\$5	X 20	\$ 100	EVEN	\$ 100
BEANS	\$10	X 00	\$ 0	TRP'LD	\$ 0
OATS	\$5	X 00	\$ 0	DBL'D	\$ 0
TOBACCO	\$20	X 30	\$ 600	GOT 1/2	\$ 900
HOGS	\$10/HEAD	X 10	\$ 100	LOST 1/2	\$ 50
CATTLE	\$20/HEAD	X 00	\$ 0	EVEN	\$ 0
SHEEP	\$10/HEAD	X 20	\$ 200	LOST ALL	\$ 0
SAVINGS	\$--	\$ 100			

RESULTS
GAINED \$ 159

WANT TO TRY AGAIN? *

PRODUCT	PER ACRE	# OF ACRES USED	TOTAL SPENT	INVESTMENT RETURNED	GROSS INCOME
CORN	\$10	X 10	\$ 100	TRP'LD	\$ 300
WHEAT	\$5	X 20	\$ 100	EVEN	\$ 100
BEANS	\$10	X 00	\$ 0	TRP'LD	\$ 0
OATS	\$5	X 00	\$ 0	DBL'D	\$ 0
TOBACCO	\$20	X 30	\$ 600	GOT 1/2	\$ 900
HOGS	\$10/HEAD	X 10	\$ 100	LOST 1/2	\$ 50
CATTLE	\$20/HEAD	X 00	\$ 0	EVEN	\$ 0
SHEEP	\$10/HEAD	X 20	\$ 200	LOST ALL	\$ 0
SAVINGS	\$--	\$ 100			

Program Listing

```

45 G=1:GOSUB2000:PRINT:PRINT:PRINT"          A BUSINESS GAME"
50 PRINT:INPUT"WANT INSTRUCTIONS";A$
   :IF(A$="Y")OR(A$="YES")GOSUB1000
60 CLS:CLER200:DIMI$(9),C$(9),T(8),GR(8),RT$(6):GOSUB3000
70 ' ** PRINT THE FIELD
75 PRINT122,"YOUR":PRINT186,"FIELDS":G=2:GOSUB2000
80 FORX=1TO111:SET(X,1):SET(X,6):NEXT
90 FORY=1TO11:SET(1,Y):SET(23,Y):SET(45,Y):SET(67,Y)
   :SET(89,Y):SET(111,Y):NEXT
100 LO=15747:LN=LO:LL=15426
110 ' ** SET UP TABLE
120 PRINT258,"          COST          # OF          TOTAL
      INVESTMENT      GROSS"
130 PRINT322,"PRODUCT  PER ACRE  ACRES USED  SPENT
      RETURNED      INCOME"
140 FORN=1TO9:FORJ=1TOLEN(I$(N)):L=ASC(MID$(I$(N),J,1))
150 POKELN-1+J,L:NEXTJ
160 POKELN+9,36:FORJ=1TOLEN(C$(N)):L=ASC(MID$(C$(N),J,1))
170 POKELN+9+J,L:NEXTJ:IFN<>9POKELN+18,83
180 LN=LN+64:NEXTN

```

Illustrated by Josh Randall

The agri-business game presented here was developed from ideas used in a class for gifted children. It will offer challenge to all groups of young students, however.

The game should be played in conjunction with outside research into the short and long term past history of the various commodity prices. Note that in this simple random payoff form, there's still a lot of chance involved, as in real life. Students learn to expect these as usual payoffs, from "lost all" to "tripled", when actual changes may not be that pronounced. It is also helpful for them to make running computations as the computer keeps track. It's interesting to watch kids play this game for the first time. They must decide whether to spend the most for the most expensive crops or buy one of each — a decision they'll often face in other situations.

An Educational Agri-Business Simulation

The program is written in TRS-80 Level II Basic. The method of poking screen locations speeds up the graphics. Nothing will turn off a student quicker than a slow interaction with the computer.

The INKEYS function for the TRS-80 also eases input since you don't need the enter key. A blinking cursor keeps the input dynamic during play.

Allocation of fields to crops and livestock is displayed as input is made, as a reminder of how much space is available. Error prompts are injected when cash or land are overdrawn.

A lot of spin-offs in business and other areas quickly come to mind. Under development is a first stage program that will input student price trend research and then set a statistical pattern for the payoffs. However, if you go this route, don't forget some good old "storm, freeze and drought" catastrophes to keep them aware of how risky it is when you live off the land. □

```

190 ' ** INPUT DESIRED INVESTMENTS
200 LN=LO+25:SU=1200:TL=100:P=0:G=4:GOSUB2000:FORN=1TO3
210 PRINT0960,CHR$(30);"HOW MANY 10 ACRE FIELDS WILL YOU USE
FOR THIS ITEM?";G=1:GOSUB2000
220 GOSUB4000
230 AS=INKEY$:IFA$=""GOTO230
235 POKELN,VAL(AS)+48:POKELN+1,48
250 IF(TL-(10*VAL(AS))<0PRINT0960,CHR$(30);"NOT ENOUGH LAND
LEFT !!";G=2:GOSUB2000:GOTO210
260 IFSU-(10*VAL(AS)*VAL(C$(N)))<0PRINT0960,CHR$(30);"NOT
ENOUGH CASH LEFT !!";G=2:GOSUB2000:GOTO210
265 LN=LN+8:A=VAL(AS):IFA=0GOTO310
270 LX=LL
280 FORZ=1TOA:FORJ=1TOLEN(I$(N))
285 L=ASC(MID$(I$(N),J,1))
290 POKELX+J,L
295 NEXTJ:P=P+1:IFP=5THENLL=LL+84:GOTO297
296 LL=LL+11
297 LX=LL:NEXTZ
300 ' ** ARITHMETIC
310 T(N)=10*A*VAL(C$(N))
320 POKELN,36:AS=STR$(T(N)):FORJ=1TOLEN(AS)
330 POKELN+J,ASC(MID$(AS,J,1)):NEXTJ
350 LN=LN+56:PRINT0960,CHR$(30);G=1:GOSUB2000:TL=TL-(10*A)
:SU=SU-T(N):NEXTN
355 LL=LN+63:POKELN,36
360 SAS=STR$(SU):FORJ=1TOLEN(SAS)
370 POKELN+J,ASC(MID$(SAS,J,1)):NEXTJ
380 LN=LO
400 ' ** COMPUTER FIGURES PAYOFFS
405 RT$(1)="LOST 1/2":RT$(2)="EVEN":RT$(3)="GOT 1/2":RT$(4)=
"DBL'D":RT$(5)="TRP'LD":RT$(6)="LOST ALL"
410 G=2:GOSUB2000
420 FORZ=1TO3:R=RND(6):LN=LO+43
430 ONRGOTO440,450,460,470,480,490
440 RT=.5:GOSUB5000:GOTO500
450 RT=1:GOSUB5000:GOTO500
460 RT=1.5:GOSUB5000:GOTO500
470 RT=2:GOSUB5000:GOTO500
480 PT=3:GOSUB5000:GOTO500
490 RT=0:GOSUB5000:GOTO500
500 GR(Z)=INT(T(Z)*RT)
510 GR$=STR$(GR(Z))
520 POKELN,36:FORJ=1TOLEN(GR$)
530 POKELN+1+J,ASC(MID$(GR$,J,1)):NEXTJ
540 LO=LO+64:G=1:GOSUB2000:NEXTZ
550 SA=INT(SU*.09)
600 ' ** TOTALS
610 FORJ=0TO128STEP64:PRINT0J,CHR$(30):NEXTJ
615 PRINT00,"R E S U L T S"
620 G=2:GOSUB2000
630 FORJ=1TO8:TT=TT+GR(J):NEXTJ:TT=TT+SA:TT=INT(TT)
640 IFTT<1200:N$="LOST " ELSE N$="GAINED "
650 TT=ABS(1200-TT)
660 PRINT064,N$:PRINTCHR$(30);"$ ";TT:GOTO700
700 G=6:GOSUB2000:PRINT0192,"WANT TO TRY AGAIN";
710 INPUTA$:IF A$="Y"ORAS="YES"RUN60
720 END
1000 CLS:PRINT"YOU ARE A BUSINESS PERSON"
1010 PRINT"YOU HAVE $1200 TO INVEST AND...."
1020 PRINT"ONLY 10 - 10 ACRE FIELDS TO"
1030 PRINT"INVEST IT ON.":PRINT
1040 PRINT"ENTER THE NUMBER OF FIELDS (NOT TOTAL ACRES) YOU
WISH TO USE FOR EACH CROP (OR LIVESTOCK).
1050 PRINT:PRINT"ANY CASH LEFT OVER WILL BE INVESTED IN
SAVINGS @ 9% INTEREST"
1060 PRINT:PRINT"THE COMPUTER WILL GIVE YOU YOUR PAYOFF."
1065 G=6:GOSUB2000
1070 PRINT"LOTS OF LUCK..... FUTURE FARMER OF AMERICA !!!!!"
1075 INPUT"PRESS ENTER TO CONTINUE";A$
1080 RETURN
2000 FOR=1TO500*G:NEXTT:RETURN
3000 FORI=1TO9:READI$(I):NEXT
3010 FORI=1TO3:READC$(I):NEXT:C$(9)="--"
3050 RETURN
3060 DATACORN,WHEAT,BEANS,OATS,TOBACCO,HOGS,CATTLE,SHEEP,SAVINGS
3070 DATA10,5,10,5,20,10/HEAD,20/HEAD,10/HEAD
4000 FOR=1TO3:FORI=1TO20
4010 POKELN,140:POKELN+1,140
4020 NEXTI:FORI=1TO20
4030 POKELN,32:POKELN+1,32
4040 NEXTI:NEXTT:RETURN
5000 FORJ=1TOLEN(RT$(R))
5010 POKELN,ASC(MID$(RT$(R),J,1))
5020 LN=LN+1:NEXTJ:LN=LN+5:G=1:GOSUB2000:LN=LO+54:RETURN

```


How to write for Personal Computing

You've written the programs we want to publish. You — the *Personal Computing* readers — are using your computers in businesses, homes, offices and schools. Other readers, just as software-hungry as you, are eager to try out your programs, your applications and your techniques. So why not share what you've done by submitting an article to *PC*?

It's easier than you might think. Remember: we're more interested in practical programs and useful applications than in fancy prose. And our editorial staff stands ready to help with any problems you encounter in writing your article; just give us a call at (617) 232-5470.

Here are some handy guidelines to help you get started.

First, decide what kind of article you want to write. Do you have a *business program* that will help an executive, salesman, doctor, lawyer or shopkeeper function more efficiently? Think about how businesses can benefit from microcomputers — not only in the obvious areas of inventory, accounting and payroll, but in all departments and levels right up to the president's desk. Financial and marketing analysis, time management, planning, material handling, product design and cost accounting are areas ripe for creative programming.

How do you use your computer for *home and personal applications* in your living room, kitchen, study or den? Again, think beyond the obvious areas of checkbook balancing and budgeting (though these areas are far from exhausted) to other applications. Hobbies, home management, household inventory, gardening and landscaping, personal income and expense analysis, personal mailing lists and word processing are just a few ideas to spark your imagination.

What *education programs* have you written for children, adults, professionals, businessmen and teachers? Computers can not only teach children basic subjects such as spelling, math, geography, economics, civics, grammar, literature and science, but can help adults review or sharpen skills in these areas as well. How else can computers function in or out of the classroom to aid learning? To help teachers and administrators?

Are you proficient in some programming technique or special computer area you could explain in

a *tutorial article*? How do you save time, money, computer memory or frustration when programming or using your computer? Others can benefit from the same techniques you use.

Computer games, history, humor and fiction are other areas rich in article and story ideas.

Your second step is to write the text of the article. Remember, readers aren't familiar with your program. So explain in detail what the program does and how it does it. Include here the overall structure of your program as well as any special algorithms or routines you've used. Give suggestions for modifying or expanding the program for other applications, other businesses or other situations.

Third, prepare your supporting documentation. Include at least a program listing and one or two sample runs, and add program notes to explain any special commands used or other special features of your program. Use charts, diagrams, figures and photos if they help explain your program and its use.

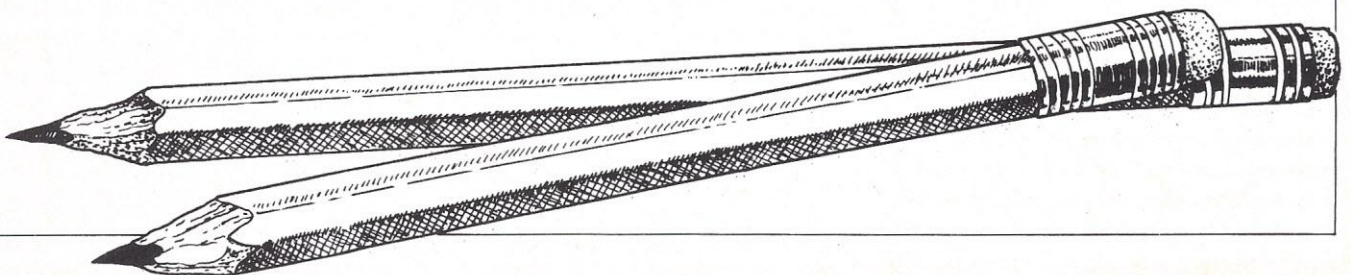
Finally, mail your manuscript. Address it to: Don Wood, Managing Editor, *Personal Computing Magazine*, 1050 Commonwealth Ave., Boston, MA 02215.

A few suggestions: All submissions should be original, typed (*not* all CAPS), double-spaced and neat. Please include your name and address on the first page of the article and enclose a self-addressed, stamped envelope for return of material.

Since we photograph program listings and sample runs exactly as you send them to us for publication in the magazine, please be sure you use a fresh ribbon for computer printouts. If you don't have a printer, you can type your listings single spaced; but again, be sure you use a new ribbon. (If your program relies heavily on graphics, you can photograph sample runs from your CRT. But take care to avoid distortion due to the curve of the screen.)

Feel free to call us if you have any questions or want to discuss specific ideas. We can give you feedback and suggest appropriate slants and approaches.

We're always looking for fresh, original ideas. While these guidelines will help you in preparing material for *Personal Computing*, don't assume we don't want your idea just because it's not mentioned here. Let us and our readers know what *you're* doing with your computer.



A Gradebook for Teacher

BY ERIC GEOFFREY VANN

Educators will appreciate this science grading program, an electronic grade book and administrative aid, which is readily adaptable to other subjects.

The program is written in Applesoft Basic for an Apple with 48K RAM and an Applesoft firmware card, two disk drives placed in slot #6, and a high speed serial interface in slot #1. A Texas Instruments 810 RO printer was used.

Each of the program's subprograms is run by the assembly language routine CHAIN found on the master diskette included in the updated DOS 3.2 from Apple Computer, Inc.

Beginning with the Hello program menu we find seven user functions:

Eric Geoffrey Vann teaches science in the Darien School District #61, Illinois. He is presently a Masters Degree candidate at the University of Chicago, specializing in curriculum development, with special emphasis on software development for junior high school science classes.

Details creates and maintains a file of details pertaining to each classroom assignment (e.g., due dates, titles, page numbers, etc.).

Scores maintains student scores in records (256 bytes per record) within files designated by class/section. This eliminates the need for more than one disk for up to six classes (at 4 bytes per score entered there is room for 64 scores per student, in classes sized 50).

Scores for homework and test/quizzes are entered into the computer in the following form: 100H or 100T, respectively. Each grade is assumed to be based on a percentage scale. If the student was not enrolled at the time the assignment was given, an entry of N/AH or N/AT will cause the computer to refrain from including that score in the student's overall average. If the student was merely absent on the day the assignment was given, an entry of N/GH or N/GT will signal the computer of the absenteeism and tell it to expect a grade in future. The computer will refer to this grade as incomplete in all output thereafter and will qualify any grade

assigned the student until the incomplete is replaced with a score.

Rosters creates the file where the names of each student in a given class/section are kept. The user may access the student names via this subprogram individually, or by an entire class.

Notices produces a progress notice for each student to take home to his/her parent(s). On the notice is a description of each assignment or class exam given, along with their due dates and an indication if the assignment is incomplete. The scores received on each assignment are also listed. At the bottom of the notice appears the test average, homework average and overall average (test avg. plus homework avg. divided by two) of each student. Letter grades are also assigned to the overall average based on the grading scale imbedded in the program. These come complete with the appropriate plus (+) or minus (-) signs where needed.

Grades produces an administrative grade report. As in the case of the Notices subprogram, this program allows you to review one or more stu-

```

*****STUDENT PROGRESS NOTIFICATION*****
CLASS #6
EISENHOWER JUNIOR HIGH SCHOOL          04-JUL-1776
1410 75TH STREET                        TEACHER: MR. ERIC G. VANN
DARIEN, IL 60559                       PRINCIPAL: MR. JOHN C. NOTHACKER
*****
ID# NAMES      TEST AVG.  HOMEWORK AVG.  OVERALL AVG.  COMMENTS
*****
1  AHRUM HUNTER  65.5      93.75         79.62         D
2  BOW AL       66        93.75         79.87         D
3  CLARA SANDRA 78.5      93.75         86.12
4  FUTZ BAYER   80        91.66         85.83         (INC.)
5  HESS STEWART 76        74.66         75.33         D (INC.)
6  KNIED NAUCH  62        93.75         77.87         D
7  PITTS HAROLD 93.5      93.75         93.62
8  SHUH JIM     100       100          100           (INC.)
9  SIHL WENDA   69        93.75         81.37
10 THUN WUHN    77.5      100          88.75
11 VANN ERIC    97.5      94.25         95.87
12 WILLOUGH PERCY 89.5      100          94.75
*****
# TEST GRADES =2      # HOMEWORK GRADES =4      TOTAL # ASSIGNMENTS =6
*****
COPIES TO BE SENT TO:
GUIDANCE COUNSELOR: MR. JOSEPH O. PEDERSEN
ASS'T PRINCIPAL: MR. CHARLES W. GRAY

```


STUDENT #7 IS: PITTS HAROLD CLASS #6
 *****SCIENCE PROGRESS NOTICE*****
 EISENHOWER JUNIOR HIGH SCHOOL 04-JUL-1976
 1410 75TH STREET TEACHER: MR. ERIC G. VANN
 DARIEN, IL 60559 TELEPHONE: (312) 964-5200

 ASSIGN. # ASSIGNMENT DESCRIPTION GRADE (%) DUE DATES

 1 LAB SAFETY QUIZ 88T 07-SEP-1979
 2 CLASS PREPARATION 100H 07-SEP-1979
 3 SCIENTIFIC METHODS QUIZ 99T 10-SEP-1979
 4 T/S/M PACKET QUEST. 1-2 100H 11-SEP-1979
 5 T/S/M PACKET QUEST. 3 75H 12-SEP-1979
 6 T/S/M PACKET QUEST. 4 100H 13-SEP-1979

 TEST AVERAGE= 93.5 PARENTS SIGNATURE AND DATE BELOW:
 HOMEWORK AVERAGE= 93.75
 OVERALL AVERAGE= 93.62
 YOUR LETTER GRADE IS: B+

STUDENT #8 IS: SHUH JIM CLASS #6
 *****SCIENCE PROGRESS NOTICE*****
 EISENHOWER JUNIOR HIGH SCHOOL 04-JUL-1976
 1410 75TH STREET TEACHER: MR. ERIC G. VANN
 DARIEN, IL 60559 TELEPHONE: (312) 964-5200

 ASSIGN. # ASSIGNMENT DESCRIPTION GRADE (%) DUE DATES

 1 LAB SAFETY QUIZ EXCUSED (T) 07-SEP-1979
 2 CLASS PREPARATION 100H 07-SEP-1979
 3 SCIENTIFIC METHODS QUIZ 100T 10-SEP-1979
 4 T/S/M PACKET QUEST. 1-2 NO GRADE (H) 11-SEP-1979
 5 T/S/M PACKET QUEST. 3 100H 12-SEP-1979
 6 T/S/M PACKET QUEST. 4 100H 13-SEP-1979

 TEST AVERAGE= 100 PARENTS SIGNATURE AND DATE BELOW:
 HOMEWORK AVERAGE= 100
 OVERALL AVERAGE= 100
 YOUR LETTER GRADE IS: A+ (INCOMPLETE / SOME GRADES STILL UNRECORDED!)

dents at a time. The students are listed alphabetically with the three averages following their names. In the rightmost column are comments pertaining to those students who are in danger of failure. Students with incompleting assignments are also indicated.

Edit allows maintenance of any of the stored class rosters. Names may be both deleted and added. All rosters are realphabetized before being returned to the disk.

Quit allows an orderly exit from the program, using an appropriate message.

Each program has its inherent strengths and weaknesses. I'd like to comment on those pertinent to this program.

Weaknesses

Basic executing by an interpreter does so more slowly than Pascal compiled into p-code and then interpreted.

A histogram showing the distribution of letter grades would aid the teacher in assessing teaching strategies. This feature could be added to the program.

Typing in grades can be drudgery. Obtaining an optical mark sensing card reader might ease the tedium as well as minimize the number of entry errors.

The administrative grades release might be listed with the students ranked according to class average (for honor

roll identification purposes).

While CHAINING in a program segment might take a full second or more, it is a must where flexibility and memory core conservation are concerned. I have run the program in both its present form and as an unsegmented unit. From the standpoint of ease of modification and flexibility the present structure is more effective.

Strengths

The Quicksort routine employed is the fastest I've seen. Unlike many such programs this one sorts class rosters and provides for their maintenance.

This program, unlike others, makes use of only one diskette, thus making the job of "backing up" your records less of a tedious and bothersome task. In previous revisions I tried the multi-disk approach and found more often than not that I did forget to change disks. This on several occasions meant a loss of valuable time during reentry of the misplaced data.

The CHAINING function of Apple DOS 3.2 makes modularization of microprograms a snap. Program modification proceeds in a straightforward fashion with fewer mistakes since the program segments are smaller. Also, shorter program segments are more readable.

Assuming a weekly updating of scores, the great savings of time is in the production of progress reports at report card time. I also found that when parent/teacher conferences take place the teacher has fewer complaints with regards to lack of information concerning the basis for giving a particular grade.

Both students and parents appreciate the detailed itemization on the progress notice. It readily advises parents of student study habits and commitment to assignment completion.

The grades-release form with the names deleted (student I.D. #'s visible) gives students a weekly look at their own progress. This report provides the nearly constant feedback so vital to any interactive environment.

Students with outstanding work are indicated on both the progress notice and the administrative grades release forms.

Unlike some programs, this one allows for the addition of a student to the class list who has enrolled after the initial class roster has been entered. Yet, it will still produce an alphabetized roster and accurately calculate all averages. It takes into account even those assignments missed!

Formatted code keeps the program readable and thus modifiable by those unfamiliar with the specific algorithm.

Entry of erroneous data has been minimized by numerous error-trapping routines. The Apple's sound producing capability is used to signal certain entry errors. □

Program Listings

Hello

```

900 : REM *****
910 : REM *
920 : REM * SCIENCE GRADING PROGRAM *
930 : REM *
940 : REM * VERSION 5.2 *
950 : REM *
960 : REM * WRITTEN BY ERIC GEOFFREY VANN *
970 : REM *
980 : REM * COMPLETED 26-JAN-1979 *
990 : REM *
1000 : REM * (6:05 PM FRIDAY) *
1010 : REM *
1020 : REM * DEDICATED TO MY WIFE CONNIE WHO IS *
1030 : REM *
1040 : REM * EVER A SOURCE OF ENCOURAGEMENT *
1050 : REM *
1060 : REM *****
1070 :
1080 :
1090 : REM THE SCIENCE GRADING PROGRAM IS DESIGNED
1100 : REM TO ALLOW THE USER TO PRODUCE ONE OF TWO
1110 : REM EXTREMELY USEFUL DOCUMENTS:
1120 : REM 1-A PROGRESS REPORT ON THE GRADES
1130 : REM ON THE CLASS AS A WHOLE
1140 : REM 2-AN INDIVIDUAL PROGRESS NOTICE
1150 : REM THAT CAN BE SENT HOME TO NOTIFY
1160 : REM THE PARENTS OF THE STUDENTS
1170 : REM PROGRESS TO DATE
1180 :
```



```

1190 : TEXT : CLEAR
1200 : LET D$ = CHR$ (4)
1210 : LET OP$ = "OPEN":RF$ = "READ":WF$ = "WRITE":CL$ = "CLOSE"
1220 : LET R$ = ",R":L$ = ",L256":BY$ = ",B":V$ = ",V0":D1$ = ",D1"
      :D2$ = ",D2":LS$ = ",L32"
1230 :
1240 : DIM A$(50),B$(50),E$(50)
1250 :
1260 : DIM N$(100),S9(20,2)
1270 :
1280 : DIM GD$(50)
1290 :
1300 : LET BL$ = "  "
1310 :
1320 : PRINT D$:"NOMON C,I,O"
1330 :
1340 : GOSUB 1600
1350 :
1360 : VTAB 22: PRINT TAB( 11)
1370 : PRINT "INSTRUCTIONS? (Y/N)";
1380 : INPUT Y$
1390 : IF LEFT$(Y$,1) = "Y" THEN GOSUB 1810
1400 :
1410 : GOSUB 2100
1420 :
1430 : INPUT K
1440 :
1450 : HOME
1460 :
1470 : IF K > 7 OR K < 1 THEN GOTO 1430
1480 : ON K GOTO 1530,1540,1550,1560,1570,1580,1500
1490 :
1500 : HOME : VTAB 8: PRINT "      GOOD-BYE...FOR NOW..."
1510 : END
1520 :
1530 : PRINT CHR$(4);"BLOADCHAIN.A520": CALL 520"DETAILS FILE CREATION"
1540 : PRINT CHR$(4);"BLOADCHAIN.A520": CALL 520"SCORES FILE UPDATING"
1550 : PRINT CHR$(4);"BLOADCHAIN.A520": CALL 520"ROSTER FILE UPDATING"
1560 : PRINT CHR$(4);"BLOADCHAIN.A520": CALL 520"PROGRESS NOTICE GENERATION"
1570 : PRINT CHR$(4);"BLOADCHAIN.A520": CALL 520"ADMINISTRATIVE NOTIFICATION"
1580 : PRINT CHR$(4);"BLOADCHAIN.A520": CALL 520"ROSTER FILE EDITING SECTION"
1590 :
1600 REM *****
1610 REM * BANNER GRAPHICS : SUBROUTINE *
1620 REM *****
1630 :
1640 :
1650 : TEXT : HOME : VTAB 5
1660 : PRINT "*****";
1670 : PRINT " *";
1680 : PRINT " * SCIENCE GRADING PROGRAM *";
1690 : PRINT " *";
1700 : PRINT " * VERSION 5.2 *";
1710 : PRINT " *";
1720 : PRINT " * WRITTEN BY ERIC G. VANN *";
1730 : PRINT " *";
1740 : PRINT " * COPYRIGHT (C) 1979 *";
1750 : PRINT " *";
1760 : PRINT "*****";
1770 :
1780 : RETURN
1790 :
1800 :
1810 REM *****
1820 REM * INSTRUCTIONS TO USER : SUBROUTINE *
1830 REM *****
1840 :
1850 :
1860 : HOME : VTAB 6
1870 : PRINT "*****INSTRUCTIONS*****"
1880 : VTAB 9
1890 : PRINT "THIS PROGRAM IS DESIGNED TO LET YOU DO ";
1900 : PRINT "ANY OF SEVERAL TASKS IN YOUR CHOICE OF ";
1910 : PRINT "ORDER ";
1920 : PRINT "FIRST: YOU CAN CREATE AND UPDATE A FILE ";
1930 : PRINT " THAT DESCRIBES ALL ASSIGNMENTS ";
1940 : PRINT "SECOND:YOU CAN CREATE A ROSTER FILE IN ";
1950 : PRINT " WHICH ALL STUDENT NAMES APPEAR ";
1960 : PRINT "THIRD: YOU CAN PRINT PROGRESS NOTICES ";
1970 : PRINT " OR AN ADMINISTRATIVE REPORT OF ";
1980 : PRINT " STUDENTS GRADES ";
1990 : PRINT
2000 : PRINT
2010 : PRINT "*****";
2020 : PRINT
2030 : PRINT
2040 : PRINT " NOW HIT ANY KEY TO CONTINUE...";
2050 : CALL - 715: REM LETS VIEWER READ THE SCREEN (MONITOR).
2060 :
2070 : RETURN
2080 :

```

Note: There are
101 spaces between
the quote marks.

```

2090 :
2100 REM *****
2110 REM * MENU : SUBROUTINE *
2120 REM *****
2130 :
2140 :
2150 REM WE WILL INITIALIZE ONE STRING VARIABLE (KEY$)
2160 :
2170 : KEY$ = CHR$ (0)
2180 :
2190 REM THE MENU
2200 :
2210 : HOME
2220 : PRINT "*****SUMMARY OF REQUESTS*****";
2230 : PRINT " *";
2240 : PRINT " * 1. DETAILS - CREATES AND UPDATES A *";
2250 : PRINT " * LIST OF ALL ASSIGNMENTS *";
2260 : PRINT " *";
2270 : PRINT " * 2. SCORES - CREATES AND UPDATES A *";
2280 : PRINT " * LIST OF STUDENT SCORES *";
2290 : PRINT " *";
2300 : PRINT " * 3. ROSTERS - CREATES AND UPDATES A *";
2310 : PRINT " * LIST OF STUDENTS IN THE *";
2320 : PRINT " * CLASS *";
2330 : PRINT " *";
2340 : PRINT " * 4. NOTICES - PRINTS PROGRESS NOTICES *";
2350 : PRINT " *";
2360 : PRINT " * 5. GRADES - PRODUCES LIST OF GRADES *";
2370 : PRINT " * OF STUDENTS IN CLASS *";
2380 : PRINT " *";
2390 : PRINT " * 6. EDIT - ALLOWS USER TO EDIT THE *";
2400 : PRINT " * ROSTER FILE *";
2410 : PRINT " *";
2420 : PRINT " * 7. QUIT - EXIT PROGRAM HERE *";
2430 : PRINT " *";
2440 : PRINT "*****";
2450 : PRINT " TYPE NUMBER OF YOUR SELECTION (1-7)";
2460 :
2470 : RETURN
2480 :
2490 :

```

Details File Creation

```

1000 REM *****
1010 REM * DETAILS FILE : SUBROUTINE *
1020 REM *****
1030 :
1040 :
1050 REM THE SCREEN IS CLEARED ...
1060 REM THEN THE USER IS ASKED TO CHOOSE THE PROPER CLASS LIST TO WHICH
1070 REM THE ASSIGNMENT DESCRIPTIONS WILL APPLY.
1080 :
1090 REM AS WELL WE MUST DETERMINE WHICH SPECIFIC ASSIGNMENTS WILL
1100 REM BE DESCRIBED. TO DO THIS WE MUST INDICATE THE FIRST AND LAST
1110 REM ASSIGNMENT NUMBERS IN QUESTION.
1120 :
1130 :
1140 : HOME : VTAB 3
1150 : PRINT "*****DETAILS FILE SELECTION*****";
1160 : PRINT " *";
1170 : PRINT " * 1. CLASS : SECTION NUMBER ONE *";
1180 : PRINT " *";
1190 : PRINT " * 2. CLASS : SECTION NUMBER TWO *";
1200 : PRINT " *";
1210 : PRINT " * 3. CLASS : SECTION NUMBER THREE *";
1220 : PRINT " *";
1230 : PRINT " * 4. CLASS : SECTION NUMBER FOUR *";
1240 : PRINT " *";
1250 : PRINT " * 5. CLASS : SECTION NUMBER FIVE *";
1260 : PRINT " *";
1270 : PRINT " * 6. CLASS : SECTION NUMBER SIX *";
1280 : PRINT " *";
1290 : PRINT "*****";
1300 : PRINT
1310 : PRINT " TYPE YOUR CLASS SELECTION NUMBER (1-6) ";
1320 :
1330 : INPUT DF$
1340 :
1350 : IF DF$ = CHR$(13) THEN 1330
1360 : IF DF$ > CHR$(54) OR DF$ < CHR$(49) THEN 1330
1370 : IF DF$ = "1" THEN DF$ = "CLASS #1"
1380 : IF DF$ = "2" THEN DF$ = "CLASS #2"
1390 : IF DF$ = "3" THEN DF$ = "CLASS #3"
1400 : IF DF$ = "4" THEN DF$ = "CLASS #4"
1410 : IF DF$ = "5" THEN DF$ = "CLASS #5"
1420 : IF DF$ = "6" THEN DF$ = "CLASS #6"
1430 :
1440 :
1450 : GOSUB 2000

```



```

1460 :
1470 : GOSUB 1910
1480 :
1490 : PRINT "I NEED TO KNOW THE NATURE OF THE ASSIGNMENTS AND THEIR DUE
      DATES."
1500 : PRINT "PLEASE ENTER THESE IN THE ORDER ASKED."
1510 : FOR R = BASSN TO FASSN
1520 : VTAB 13: PRINT "ASSIGNMENT #": FLASH: PRINT R: NORMAL:
      PRINT " BEING UPDATED"
1530 : PRINT: PRINT: INVERSE: PRINT "DESCRIPTION": NORMAL
1540 : INPUT A$(R)
1550 : PRINT: INVERSE: PRINT "DUE DATE": NORMAL: PRINT " "
1560 : INPUT B$(R)
1570 : VTAB 16: HTAB 13: PRINT " "
1580 : VTAB 18: HTAB 13: PRINT " "
1590 :
1600 : LEFT$(A$(R)) = LEFT$(A$(R) + BL$(33) + LEFT$(B$(R) + BL$(14)
1610 : NEXT R
1620 :
1630 : PRINT D$(OP$):DF$:L$:D1$:V$
1640 :
1650 : FOR R = BASSN TO FASSN
1660 : PRINT D$(WF$:GF$:R$:R
1670 : PRINT E$(R)
1680 : NEXT R
1690 :
1700 : PRINT D$(CL$:DF$
1710 :
1720 : GOSUB 1910
1730 :
1740 : FOR R = BASSN TO FASSN
1750 : PRINT "DS: ";A$(R);: PRINT "DD: ";B$(R)
1760 : IF R = 15 THEN CALL - 715
1770 : IF R = 30 THEN CALL - 715
1780 : IF R = 45 THEN CALL - 715
1790 : NEXT R
1800 :
1810 : VTAB 20: INVERSE: PRINT "CHECK THE UPDATED MATERIAL. "
1820 : PRINT "IS EVERYTHING ENTERED CORRECTLY? (Y/N)": NORMAL
1830 : INPUT Y$
1840 : IF LEFT$(Y$,1) = "N" THEN 1000
1850 :
1860 : VTAB 20: PRINT LEFT$(BL$,80)
1870 : VTAB 20: INPUT "DO YOU WISH TO CREATE/UPDATE ANOTHER
      FILE? (Y/N)":Y$
1880 : IF LEFT$(Y$,1) = "Y" THEN 1000
1890 : PRINT CHR$(4):"RUN HELLO"
1900 :
1910 REM *****
1920 REM * SCREEN-CLEARING: SUBROUTINE *
1930 REM *****
1940 :
1950 :
1960 : TEXT: HOME: VTAB 5: PRINT "SCIENCE GRADING PROGRAM
      VERSION 5.2": VTAB 9
1970 :
1980 RETURN
1990 :
2000 REM *****
2010 REM * PARAMETER-SETTING: SUBROUTINE *
2020 REM *****
2030 :
2040 :
2050 REM IN THIS ROUTINE WE ASSIGN VALUES TO THE TWO VARIABLES
2060 REM BASSN...BEGINNING ASSIGNMENT NUMBER
1220 : FOR G = BID TO FID
1230 : PRINT D$(RF$:NF$:R$:G
1240 : INPUT N$(G)
1250 : NEXT G
1260 :
1270 : PRINT D$(CL$:NF$
1280 :
1290 : FOR G = BID TO FID
1300 : GOSUB 1850
1310 : VTAB 8: PRINT "PRINT THE LETTER ": INVERSE: PRINT "T": NORMAL
1320 : PRINT " AFTER ALL TEST GRADES HOMEWORK GRADES TO BE FOLLOWED BY THE
      LETTER "
1330 : INVERSE: PRINT "H": NORMAL
1340 :
1350 : FOR R = BASSN TO FASSN
1360 : VTAB 21: HTAB 23: PRINT " "
1370 : VTAB 14: PRINT "GRADES FOR: "; LEFT$(N$(G),20):" ID#":G
1380 : VTAB 21: INVERSE: PRINT "GRADE #":R: IN PERCENT: "
1390 : NORMAL: INPUT GD$(R)
1400 : IF GD$(R) = CHR$(13) OR GD$(R) = CHR$(0) THEN 1470
1410 : IF RIGHT$(GD$(R),1) < > "T" AND RIGHT$(GD$(R),1) < > "H"
      THEN 1470
1420 :
1430 : NEXT R
1440 :
1450 : GOTO 1560
1460 :
1470 : LET S = - 16336
1480 :
1490 : FOR F = 1 TO 50
1500 : LET SOUND = PEEK(S) + PEEK(S) + PEEK(S) +
      PEEK(S) + PEEK(S)
1510 : NEXT F
1520 :
1530 : GOTO 1390
1540 :
1550 :
1560 : PRINT D$(OP$:GF$:L$:D2$:V$
1570 :
1580 : FOR R = BASSN TO FASSN
1590 : PRINT D$(WF$:GF$:R$: VAL ( RIGHT$(N$(G),2):BY$:
      (- 4 + (R * 5))
1600 : PRINT GD$(R)
1610 : NEXT R
1620 :
1630 : PRINT D$(CL$:GF$
1640 :
1650 : GOSUB 1850
1660 :
1670 : PRINT "THESE ARE THE UPDATED GRADES OF: " VTAB 11
1680 : INVERSE: PRINT LEFT$(N$(G),20): NORMAL: VTAB 13
1690 :
1700 : FOR R = BASSN TO FASSN
1710 : IF RIGHT$(GD$(R),1) = "T" THEN PRINT "GR#":R: SPC(1):
      INVERSE: PRINT GD$(R): NORMAL
1720 : IF RIGHT$(GD$(R),1) = "H" THEN PRINT "GR#":R:
      SPC(1):GD$(R),
1730 : NEXT R
1740 : VTAB 22: HTAB 1: INVERSE: PRINT "ARE THESE SCORES CORRECT
      AS SHOWN? (Y/N)": NORMAL
1750 : INPUT Y$
1760 : IF LEFT$(Y$,1) = "N" THEN 1300
1770 : NEXT G
1780 :
1790 : VTAB 22: PRINT LEFT$(BL$,80)
2430 :
2440 REM THIS SUBROUTINE WILL BE USED SEVERAL TIMES
2450 :
2460 : PRINT "*****ROSTERS FILE SELECTION*****";
2470 : PRINT " "
2480 : PRINT " * 1. CLASS : SECTION NUMBER ONE "
2490 : PRINT " "
2500 : PRINT " * 2. CLASS : SECTION NUMBER TWO "
2510 : PRINT " "
2520 : PRINT " * 3. CLASS : SECTION NUMBER THREE "
2530 : PRINT " "
2540 : PRINT " * 4. CLASS : SECTION NUMBER FOUR "
2550 : PRINT " "
2560 : PRINT " * 5. CLASS : SECTION NUMBER FIVE "
2570 : PRINT " "
2580 : PRINT " * 6. CLASS : SECTION NUMBER SIX "
2590 : PRINT " "
2600 : PRINT "*****"
2610 : PRINT
2620 : PRINT " TYPE NUMBER OF YOUR SELECTION (1-6)":
2630 :
2640 : INPUT NF$
2650 :
2660 : IF NF$ = CHR$(13) THEN 2640
2670 : IF NF$ > CHR$(54) OR NF$ < CHR$(49) THEN 2640
2680 : IF NF$ = "1" THEN NF$ = "NAMES CLASS #1":DF$ = "CLASS #1":GF$ =
      "GRADES CLASS #1"
2690 : IF NF$ = "2" THEN NF$ = "NAMES CLASS #2":DF$ = "CLASS #2":GF$ =
      "GRADES CLASS #2"
2700 : IF NF$ = "3" THEN NF$ = "NAMES CLASS #3":DF$ = "CLASS #3":GF$ =
      "GRADES CLASS #3"
2710 : IF NF$ = "4" THEN NF$ = "NAMES CLASS #4":DF$ = "CLASS #4":GF$ =
      "GRADES CLASS #4"
2720 : IF NF$ = "5" THEN NF$ = "NAMES CLASS #5":DF$ = "CLASS #5":GF$ =
      "GRADES CLASS #5"
2730 : IF NF$ = "6" THEN NF$ = "NAMES CLASS #6":DF$ = "CLASS #6":GF$ =
      "GRADES CLASS #6"
2740 :
2750 RETURN
2760 :
2770 :
2780 REM *****
2790 REM * ID # PARAMETER-SETTING: SUBROUTINE *
2800 REM *****
2810 :
2820 :
2830 REM IN THIS ROUTINE WE ASSIGN VALUES TO THE TWO VARIABLES
2840 REM BID...BEGINNING IDENTIFICATION NUMBER
2850 REM FID...FINAL IDENTIFICATION NUMBER
2860 REM WHEN THESE VALUES ARE OBTAINED THE COMPUTER KNOWS
2870 REM HOW TO ISOLATE THE SCORES FILE MATERIAL...
2880 :
2890 :
2900 : GOSUB 1850
2910 :
2920 : PRINT "PLEASE ENTER THE STUDENT I.D. NUMBERS OF:"
2930 : PRINT "THE FIRST AND FINAL STUDENTS ON YOUR ROSTER LIST..."
2940 : VTAB 20: INVERSE: PRINT "TYPE A ZERO (0) TO ACCESS ENTIRE FILE."
      : NORMAL
2950 : VTAB 13: PRINT "ENTER BEGINNING STUDENT ID#:"
2960 : VTAB 15: PRINT "ENTER FINAL STUDENT ID#:"
2970 : VTAB 13: HTAB 31: INPUT BID
2980 : IF BID < 1 THEN BID = 1: GOTO 3180
2990 : VTAB 15: HTAB 31: INPUT FID
3000 : VTAB 20: PRINT LEFT$(BL$,80)
3010 : VTAB 20: PRINT "IS THIS A NEW FILE? (Y/N)": INPUT ANSWER$

```



```

2070 REM FASSN...FINAL ASSIGNMENT NUMBER
2080 REM WHEN THESE VALUES ARE OBTAINED THE COMPUTER THEN KNOWS
2090 REM HOW TO ISOLATE EITHER THE DETAILS FILE MATERIAL OR...
2100 REM THE SCORES THAT WILL BE ADDED TO A GIVEN STUDENT'S RECORD.
2110 :
2120 : GOSUB 1910
2130 :
2140 : PRINT "BEGINNING ASSIGNMENT NUMBER "
2150 : VTAB 20: INVERSE : PRINT "TYPE A ZERO (0) IN ORDER TO ACCESS ENTIRE
FILE..." : NORMAL
2160 : VTAB 12: PRINT "ENDING ASSIGNMENT NUMBER "
2170 : VTAB 9: HTAB 30: INPUT BASSN
2180 : IF BASSN < 1 THEN BASSN = 1: GOTO 2380
2190 : VTAB 12: HTAB 30: INPUT FASSN
2200 : VTAB 20: PRINT LEFT$ (BL$,80)
2210 : VTAB 20: PRINT "IS THIS A NEW FILE? (Y/N)": INPUT ANSWER$
2220 : IF LEFT$ (ANSWER$,1) = "Y" THEN 2280
2230 : PRINT D$:OP$:DF$:L$:D1$:V$
2240 : PRINT D$:RF$:DF$:R$: "0"
2250 : INPUT FSSN
2260 : PRINT D$:CL$:DF$
2270 : IF FASSN < = FSSN THEN 2320
2280 : PRINT D$:OP$:DF$:L$:D1$:V$
2290 : PRINT D$:WF$:DF$:R$: "0"
2300 : PRINT FASSN
2310 : PRINT D$:CL$:DF$
2320 : VTAB 20: PRINT LEFT$ (BL$,80)
2330 : VTAB 20: PRINT "IS DISPLAY CORRECT? (Y/N)": INPUT Y$
2340 : IF LEFT$ (Y$,1) = "N" THEN 2170
2350 :
2360 RETURN
2370 :
2380 : PRINT D$:OP$:DF$:L$:D1$:V$
2390 : PRINT D$:RF$:DF$:R$: "0"
2400 : INPUT FASSN
2410 : PRINT D$:CL$:DF$
2420 : VTAB 9: HTAB 31: PRINT BASSN
2430 : VTAB 12: HTAB 31: PRINT FASSN
2440 : GOTO 2320
2450 :

```

Scores File Updating

```

1000 REM *****
1010 REM * STUDENT SCORES : SUBROUTINE *
1020 REM *****
1030 :
1040 :
1050 REM IN THIS SECTION OF THE PROGRAM
1060 REM WE ATTEMPT TO UPDATE THE SCORES OF THE VARIOUS
1070 REM STUDENTS IN EACH CLASS SECTION
1080 REM WE MUST FIRST TELL THE COMPUTER WHICH STUDENTS IN
1090 REM CREATE SCORE LISTS FOR
1100 :
1110 :
1120 : HOME : VTAB 3
1130 :
1140 : GOSUB 2400
1150 :
1160 : GOSUB 2780
1170 :
1180 : GOSUB 1940
1190 :
1200 : PRINT D$:OP$:NF$:LS$:D1$:V$
1210 :

```

```

1800 : VTAB 22: INPUT "DO YOU WISH TO UPDATE ANY FURTHER
SCORES? (Y/N)":Y$
1810 : IF LEFT$ (Y$,1) = "Y" THEN 1000
1820 : PRINT CHR$ (4):"RUN HELLO.D1"
1830 :
1840 :
1850 REM *****
1860 REM * SCREEN-CLEARING : SUBROUTINE *
1870 REM *****
1880 :
1890 :
1900 : TEXT : HOME : VTAB 5: PRINT "SCIENCE GRADING PROGRAM
VERSION 5.2": VTAB 9
1910 :
1920 RETURN
1930 :
1940 REM *****
1950 REM * PARAMETER-SETTING : SUBROUTINE *
1960 REM *****
1970 :
1980 :
1990 REM IN THIS ROUTINE WE ASSIGN VALUES TO THE TWO VARIABLES
2000 REM BASSN...BEGINNING ASSIGNMENT NUMBER
2010 REM FASSN...FINAL ASSIGNMENT NUMBER
2020 REM WHEN THESE VALUES ARE OBTAINED THE COMPUTER THEN KNOWS
2030 REM HOW TO ISOLATE EITHER THE DETAILS FILE MATERIAL OR...
2040 REM THE SCORES THAT WILL BE ADDED TO A GIVEN STUDENT'S RECORD.
2050 :
2060 : GOSUB 1850
2070 :
2080 : PRINT "BEGINNING ASSIGNMENT NUMBER "
2090 : VTAB 20: INVERSE : PRINT "TYPE A ZERO (0) IN ORDER TO ACCESS
ENTIRE FILE..." : NORMAL
2100 : VTAB 12: PRINT "ENDING ASSIGNMENT NUMBER "
2110 : VTAB 9: HTAB 30: INPUT BASSN
2120 : IF BASSN < 1 THEN BASSN = 1: GOTO 2320
2130 : VTAB 12: HTAB 30: INPUT FASSN
2140 : VTAB 20: PRINT LEFT$ (BL$,80)
2150 : VTAB 20: PRINT "IS THIS A NEW FILE? (Y/N)": INPUT ANSWER$
2160 : IF LEFT$ (ANSWER$,1) = "Y" THEN 2220
2170 : PRINT D$:OP$:DF$:L$:D1$:V$
2180 : PRINT D$:RF$:DF$:R$: "0"
2190 : INPUT FSSN
2200 : PRINT D$:CL$:DF$
2210 : IF FASSN < = FSSN THEN 2260
2220 : PRINT D$:OP$:DF$:L$:D1$:V$
2230 : PRINT D$:WF$:DF$:R$: "0"
2240 : PRINT FASSN
2250 : PRINT D$:CL$:DF$
2260 : VTAB 20: PRINT LEFT$ (BL$,80)
2270 : VTAB 20: PRINT "IS DISPLAY CORRECT? (Y/N)": INPUT Y$
2280 : IF LEFT$ (Y$,1) = "N" THEN 2110
2290 :
2300 RETURN
2310 :
2320 : PRINT D$:OP$:DF$:L$:D1$:V$
2330 : PRINT D$:RF$:DF$:R$: "0"
2340 : INPUT FASSN
2350 : PRINT D$:CL$:DF$
2360 : VTAB 9: HTAB 31: PRINT BASSN
2370 : VTAB 12: HTAB 31: PRINT FASSN
2380 : GOTO 2260
2390 :
2400 REM *****
2410 REM * ROSTER FILE MENU : SUBROUTINE *
2420 REM *****

```

```

3020 : IF LEFT$ (ANSWER$,1) = "Y" THEN 3080
3030 : PRINT D$:OP$:NF$:LS$:D1$:V$
3040 : PRINT D$:RF$:NF$:R$: "0"
3050 : INPUT FD
3060 : PRINT D$:CL$:NF$
3070 : IF FID < = FD THEN 3120
3080 : PRINT D$:OP$:NF$:LS$:D1$:V$
3090 : PRINT D$:WF$:NF$:R$: "0"
3100 : PRINT FID
3110 : PRINT D$:CL$:NF$
3120 : VTAB 20: PRINT LEFT$ (BL$,80)
3130 : VTAB 20: PRINT "IS DISPLAY CORRECT? (Y/N)": INPUT Y$
3140 : IF LEFT$ (Y$,1) = "N" THEN 2970
3150 :
3160 RETURN
3170 :
3180 : PRINT D$:OP$:NF$:LS$:D1$:V$
3190 : PRINT D$:RF$:NF$:R$: "0"
3200 : INPUT FID
3210 : PRINT D$:CL$:NF$
3220 : VTAB 13: HTAB 32: PRINT BID
3230 : VTAB 15: HTAB 32: PRINT FID
3240 : GOTO 3120
3250 :

```

Roster File Updating

```

1000 REM *****
1010 REM * CLASS ROSTERS : SUBROUTINE *
1020 REM *****
1030 :
1040 :
1050 REM IN THIS ROUTINE WE WILL CREATE A LIST FOR
1060 REM CLASS IN THE MENU. THE NAMES WILL THEN
1070 REM BE ALPHABETIZED USING A QUICKSORT ROUTINE.
1080 :
1090 :
1100 : HOME : VTAB 3
1110 :
1120 : GOSUB 2560
1130 :
1140 : GOSUB 1680
1150 :
1160 : GOSUB 1590
1170 :
1180 : PRINT " " : INVERSE : PRINT NF$: NORMAL
1190 : PRINT : PRINT "YOU NOW NEED TO TELL ME TO WHICH STUDENT":
1200 : PRINT "I.D.#'S THESE NAMES ARE TO BE ATTACHED..
1210 : PRINT " ENTER: LAST NAME (SPACE) FIRST NAME "
1220 :
1230 : FOR G = BID TO FID
1240 : VTAB 17: PRINT "STUDENT #": PRINT G: PRINT " IS: "
1250 : INPUT N$(G)
1260 : VTAB 17: PRINT TAB( 15): PRINT " "
1270 : NEXT G
1280 :
1290 : GOSUB 1590
1300 :
1310 : PRINT "PLEASE WAIT...": PRINT : PRINT : PRINT TAB( 3): PRINT
"I AM ALPHABETIZING YOUR LIST!"
1320 :
1330 : GOSUB 2160
1340 :
1350 : PRINT D$:OP$:NF$:LS$:D1$:V$
1360 :

```



```

1370 : FOR G = BID TO FID
1380 : PRINT D$;WF$;NF$;R$;G
1390 : LET N$(G) = LEFT$(N$(G) + BL$,29) + LEFT$(STR$(G) + BL$,2)
1400 : PRINT N$(G)
1410 : NEXT G
1420 :
1430 : PRINT D$;CL$;NF$
1440 :
1450 : FOR G = BID TO FID
1460 : PRINT "STUDENT: #";G;" IS "; LEFT$(N$(G),20)
1470 : IF G = 20 THEN CALL - 715
1480 : IF G = 40 THEN CALL - 715
1490 : NEXT G
1500 :
1510 : PRINT : PRINT : INVERSE : PRINT "CHECK THE UPDATED ROSTER...": NORMAL
1520 : PRINT "IS EVERYTHING ENTERED CORRECTLY? (Y/N)":
1530 : INPUT Y$
1540 : IF LEFT$(Y$,1) = "N" THEN 1000
1550 :
1560 : PRINT CHR$(4);"RUN HELLO"
1570 :
1580 :
1590 REM *****
1600 REM * SCREEN-CLEARING : SUBROUTINE *
1610 REM *****
1620 :
1630 :
1640 : TEXT : HOME : VTAB 5: PRINT "SCIENCE GRADING PROGRAM
      VERSION 5.2": VTAB 9
1650 :
1660 RETURN
1670 :
1680 REM *****
1690 REM * ID # PARAMETER-SETTING : SUBROUTINE *
1700 REM *****
1710 :
1720 :
1730 REM IN THIS ROUTINE WE ASSIGN VALUES TO THE TWO VARIABLES
1740 REM BID...BEGINNING IDENTIFICATION NUMBER
1750 REM FID...FINAL IDENTIFICATION NUMBER
1760 REM WHEN THESE VALUES ARE OBTAINED THE COMPUTER KNOWS
1770 REM HOW TO ISOLATE THE SCORES FILE MATERIAL...
1780 :
1790 :
1800 : GOSUB 1590
1810 :
1820 : PRINT "PLEASE ENTER THE STUDENT I.D. NUMBERS OF":
1830 : PRINT "THE FIRST AND FINAL STUDENTS ON YOUR ROSTER LIST..."
1840 : VTAB 20: INVERSE : PRINT "TYPE A ZERO (0) TO ACCESS ENTIRE FILE."
      : NORMAL
1850 : VTAB 13: PRINT "ENTER BEGINNING STUDENT ID#:"
1860 : VTAB 15: PRINT "ENTER FINAL STUDENT ID#:"
1870 : VTAB 13: HTAB 31: INPUT BID
1880 : IF BID < 1 THEN BID = 1: GOTO 2080
1890 : VTAB 15: HTAB 31: INPUT FID
1900 : VTAB 20: PRINT LEFT$(BL$,80)
1910 : VTAB 20: PRINT "IS THIS A NEW FILE? (Y/N)": INPUT ANSWER$
1920 : IF LEFT$(ANSWER$,1) = "Y" THEN 1980
1930 : PRINT D$;OP$;NF$;LS$;D1$;V$
1940 : PRINT D$;RF$;NF$;R$;"0"
1950 : INPUT FD
1960 : PRINT D$;CL$;NF$
1970 : IF FID < = FD THEN 2020
1980 : PRINT D$;OP$;NF$;LS$;D1$;V$
1990 : PRINT D$;WF$;NF$;R$;"0"
2000 : PRINT FID

```

```

2680 : PRINT "* 3. CLASS : SECTION NUMBER THREE *";
2690 : PRINT "*"
2700 : PRINT "* 4. CLASS : SECTION NUMBER FOUR *";
2710 : PRINT "*"
2720 : PRINT "* 5. CLASS : SECTION NUMBER FIVE *";
2730 : PRINT "*"
2740 : PRINT "* 6. CLASS : SECTION NUMBER SIX *";
2750 : PRINT "*"
2760 : PRINT "*****";
2770 : PRINT
2780 : PRINT "TYPE NUMBER OF YOUR SELECTION (1-6)":
2790 :
2800 : INPUT NF$
2810 :
2820 : IF NF$ = CHR$(13) THEN 2800
2830 : IF NF$ > CHR$(54) OR NF$ < CHR$(49) THEN 2800
2840 : IF NF$ = "1" THEN NF$ = "NAMES CLASS #1":DF$ = "CLASS #1":GF$ =
      "GRADES CLASS #1"
2850 : IF NF$ = "2" THEN NF$ = "NAMES CLASS #2":DF$ = "CLASS #2":GF$ =
      "GRADES CLASS #2"
2860 : IF NF$ = "3" THEN NF$ = "NAMES CLASS #3":DF$ = "CLASS #3":GF$ =
      "GRADES CLASS #3"
2870 : IF NF$ = "4" THEN NF$ = "NAMES CLASS #4":DF$ = "CLASS #4":GF$ =
      "GRADES CLASS #4"
2880 : IF NF$ = "5" THEN NF$ = "NAMES CLASS #5":DF$ = "CLASS #5":GF$ =
      "GRADES CLASS #5"
2890 : IF NF$ = "6" THEN NF$ = "NAMES CLASS #6":DF$ = "CLASS #6":GF$ =
      "GRADES CLASS #6"
2900 :
2910 RETURN
2920 :
2930 :

```

Progress Notice Generation

```

1000 REM *****
1010 REM * PROGRESS NOTICE : SUBROUTINE *
1020 REM *****
1030 :
1040 :
1050 REM IN THIS ROUTINE WE WILL DO THE FOLLOWING:
1060 REM 1 - WE WILL ACCESS THE PROPER DETAILS FILE MATERIALS
1070 REM 2 - WE WILL ALSO ACCESS THE PROPER CLASS ROSTER
1080 REM 3 - WE WILL THEN GO TO THE SECTION OF THE
1090 REM SUBROUTINE WHERE WE WILL BE ABLE TO
1100 REM ACTUALLY PRINT THE NOTICE ITSELF
1110 :
1120 : VTAB 3
1130 : GOSUB 3620
1140 :
1150 : GOSUB 2680
1160 :
1170 : GOSUB 3140
1180 :
1190 : PRINT D$;OP$;DF$;LS$;D1$;V$
1200 :
1210 : FOR R = BASSN TO FASSN
1220 : PRINT D$;RF$;DF$;R$;R
1230 : INPUT E$(R)
1240 : NEXT R
1250 :
1260 : PRINT D$;CL$;DF$
1270 :
1280 : PRINT D$;OP$;NF$;LS$;D1$;V$
1290 :

```

```

1920 : FOR R = BASSN TO FASSN
1930 : IF GD$(R) = "N/AT" THEN GD$(R) = "EXCUSED (T)"
1940 : IF GD$(R) = "N/GT" THEN GD$(R) = "NO GRADE (T)"
1950 : IF GD$(R) = "N/AH" THEN GD$(R) = "EXCUSED (H)"
1960 : IF GD$(R) = "N/GH" THEN GD$(R) = "NO GRADE (H)"
1970 : IF GD$(R) = "NO GRADE (T)" OR GD$(R) = "NO GRADE (H)" THEN
      Z = 1
1980 : IF Z = 1 THEN Z$ = " (INCOMPLETE / SOME GRADES
      STILL UNRECORDED!)"
1990 : PRINT SPC(1);R; SPC(10 - LEN(STR$(R)));
      LEFT$(E$(R),30);
2000 : PRINT SPC(42 - (LEN(LEFT$(E$(R),30))
      + LEN(GD$(R))))GD$(R);
2010 : PRINT SPC(7); RIGHT$(E$(R),14)
2020 : NEXT R
2030 : PRINT A$(8)
2040 : LET P$ = "PARENTS SIGNATURE AND DATE BELOW:";Q$ = "TEST AVERAGE="
2050 : LET R1$ = "HOMEWORK AVERAGE=";S$ = "OVERALL AVERAGE="
2060 : LET G$ = "YOUR LETTER GRADE IS:"
2070 : PRINT Q$; INT(100 * TA) / 100;
2080 : PRINT SPC(70 - (LEN(Q$) + LEN(STR$(INT(100 * TA) / 100))
      + LEN(P$)));P$
2090 : PRINT R1$; INT(100 * HA) / 100
2100 : PRINT S$; INT(100 * OAAVG) / 100
2110 :
2120 : IF OAAVG > = 98 THEN PRINT G$;"A+";Z$: GOTO 2250
2130 : IF OAAVG > = 96 THEN PRINT G$;"A";Z$: GOTO 2250
2140 : IF OAAVG > = 94 THEN PRINT G$;"A-";Z$: GOTO 2250
2150 : IF OAAVG > = 91 THEN PRINT G$;"B+";Z$: GOTO 2250
2160 : IF OAAVG > = 89 THEN PRINT G$;"B";Z$: GOTO 2250
2170 : IF OAAVG > = 87 THEN PRINT G$;"B-";Z$: GOTO 2250
2180 : IF OAAVG > = 84 THEN PRINT G$;"C+";Z$: GOTO 2250
2190 : IF OAAVG > = 82 THEN PRINT G$;"C";Z$: GOTO 2250
2200 : IF OAAVG > = 80 THEN PRINT G$;"C-";Z$: GOTO 2250
2210 : IF OAAVG > = 77.666667 THEN PRINT G$;"D+";Z$: GOTO 2250
2220 : IF OAAVG > = 76.333333 THEN PRINT G$;"D";Z$: GOTO 2250
2230 : IF OAAVG > = 75 THEN PRINT G$;"D-";Z$: GOTO 2250
2240 : IF OAAVG < 75 THEN PRINT G$;"F";Z$: GOTO 2250
2250 : PRINT CHR$(11)
2260 : NEXT G
2270 : PRINT D$;"PR#0"
2280 :
2290 : PRINT CHR$(4);"RUN HELLO.D1"
2300 :
2310 :
2320 REM *****
2330 REM * GRADES-RELEASE : SUBROUTINE *
2340 REM *****
2350 :
2360 REM IN THIS SUBROUTINE WE ATTEMPT TO PREPARE
2370 REM A COHERENT REPORT ON THE PROGRESS OF EACH
2380 REM STUDENT ON ONE SINGLE PAGE
2390 :
2400 : HOME : VTAB 3
2410 : GOSUB 3620
2420 :
2430 : GOSUB 3140
2440 :
2450 : GOSUB 2680
2460 :
2470 : PRINT D$;OP$;NF$;LS$;D1$;V$
2480 :
2490 : FOR G = BID TO FID
2500 : PRINT D$;RF$;NF$;R$;R;G
2510 : INPUT N$(G)
2520 : NEXT G

```



```

2010 : PRINT D$:CL$:NF$
2020 : VTAB 20: PRINT LEFT$ (BL$,80)
2030 : VTAB 20: PRINT "IS DISPLAY CORRECT? (Y/N)"; INPUT Y$
2040 : IF LEFT$ (Y$,1) = "N" THEN 1870
2050 :
2060 : RETURN
2070 :
2080 : PRINT D$:OP$:NF$:LS$:D1$:V$
2090 : PRINT D$:RF$:NF$:R$: "0"
2100 : INPUT FID
2110 : PRINT D$:CL$:NF$
2120 : VTAB 13: HTAB 32: PRINT BID
2130 : VTAB 15: HTAB 32: PRINT FID
2140 : GOTO 2020
2150 :
2160 : REM *****
2170 : REM * QUICKSORT : SUBROUTINE *
2180 : REM *****
2190 :
2200 :
2210 : REM THIS PARTICULAR ROUTINE IS ADAPTED FROM
2220 : REM THAT FOR NUMBERS PUBLISHED IN "BASIC AND THE PERSONAL COMPUTER"
2230 : REM WRITTEN BY THOMAS A. DWYER
2240 : REM PUBLISHED BY ADDISON-WESLEY COPYRIGHT 1978
2250 : REM ISBN0-201-01589-7
2260 :
2270 : LET C1 = 0: S1 = 0: P = 1
2280 : LET I1 = BID: J1 = FID
2290 : LET I = I1: J = J1: S = - 1
2300 : LET C1 = C1 + 1
2310 : IF N$(I) < N$(J) THEN 2350
2320 : LET S1 = S1 + 1
2330 : LET T$ = N$(I): N$(I) = N$(J): N$(J) = T$
2340 : LET S = SGN (- S)
2350 : IF S = 1 THEN I = I + 1
2360 : IF S < > 1 THEN J = J - 1
2370 : IF I < J THEN 2300
2380 : IF I + 1 > = J1 THEN 2400
2390 : LET P = P + 1: S9(P,1) = I + 1: S9(P,2) = J1
2400 : LET J1 = I - 1
2410 : IF I1 < J1 THEN 2290
2420 : IF P = 0 THEN 2460
2430 : LET I1 = S9(P,1): J1 = S9(P,2): P = P - 1
2440 : GOTO 2290
2450 :
2460 : GOSUB 1590: PRINT " YOUR SORT IS OVER..."
2470 :
2480 : PRINT
2490 : PRINT FID: " RANDOM NAMES"
2500 : PRINT C1: " COMPARISONS"
2510 : PRINT S1: " SWAPS"
2520 :
2530 : RETURN
2540 :
2550 :
2560 : REM *****
2570 : REM * ROSTER FILE MENU : SUBROUTINE *
2580 : REM *****
2590 :
2600 : REM THIS SUBROUTINE WILL BE USED SEVERAL TIMES
2610 :
2620 : PRINT "*****ROSTERS FILE SELECTION*****";
2630 : PRINT " *";
2640 : PRINT " * 1. CLASS : SECTION NUMBER ONE ";
2650 : PRINT " *";
2660 : PRINT " * 2. CLASS : SECTION NUMBER TWO ";
2670 : PRINT " *";

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```

1300 : FOR G = BID TO FID
1310 : PRINT D$:RF$:NF$:R$:G
1320 : INPUT N$(G)
1330 : NEXT G
1340 :
1350 : PRINT D$:CL$:NF$
1360 :
1370 : GOSUB 2590
1380 :
1390 : PRINT "STUDENTS WHOSE NOTICES ARE BEING PRINTED ARE: "
1400 : FOR G = BID TO FID
1410 : PRINT "STUDENT #":G: IS: "; LEFT$ (N$(G),20)
1420 : IF G = 20 THEN CALL - 715
1430 : IF G = 40 THEN CALL - 715
1440 : IF G = 60 THEN CALL - 715
1450 : NEXT G: PRINT
1460 :
1470 : PRINT "IS DISPLAY CORRECT? (Y/N)";
1480 : INPUT Y$
1490 : IF LEFT$ (Y$,1) = "N" THEN 1000
1500 : PRINT : PRINT : INVERSE
1510 : PRINT "ENTER THE DUE DATE TO APPEAR ON EACH NOTICE: "; NORMAL
1520 : INPUT A$(3)
1530 :
1540 : PRINT D$: "PR#1"
1550 : PRINT CHR$ (27); "91"
1560 : PRINT CHR$ (27); "6"
1570 : PRINT CHR$ (27); "1!"; CHR$ (0)
1580 : FOR G = BID TO FID
1590 : PRINT D$:OP$:GF$:L$:D2$:V$
1600 :
1610 : FOR R = BASSN TO FASSN
1620 : PRINT D$:RF$:GF$:R$: VAL ( RIGHT$ (N$(G),2))
:BY$( - 4 + (R * 5))
1630 : INPUT GD$(R)
1640 : NEXT R
1650 :
1660 : PRINT D$:CL$:GF$
1670 :
1680 : LET A$(1) =
"*****SCIENCE PROGRESS NOTICE*****"
1690 : LET A$(2) = "EISENHOWER JUNIOR HIGH SCHOOL"
1700 : LET A$(4) = "1410 75TH STREET"
1710 : LET A$(5) = "TEACHER: MR. ERIC G. VANN"
1720 : LET A$(6) = "DARIEN, IL 60559"
1730 : LET A$(7) = "TELEPHONE:(312) 964-5200"
1740 : LET A$(8) =
"*****"
1750 : LET A$(10) = "ASSIGNMENT DESCRIPTION"
1760 : LET A$(9) = "GRADE (2)"
1770 : LET B$(1) = "DUE DATES"
1780 : LET B$(2) = "ASSIGN. #"
1790 :
1800 : PRINT "STUDENT #":G: IS: "; LEFT$ (N$(G),20); SPC( 26 +
( LEN ( STR$ (G)) = 1));DF$
1810 : PRINT A$(1)
1820 : PRINT A$(2); SPC( 70 - ( LEN (A$(2)) + LEN (A$(3)))):A$(3)
1830 : PRINT A$(4); SPC( 70 - ( LEN (A$(4)) + LEN (A$(5)))):A$(5)
1840 : PRINT A$(6); SPC( 70 - ( LEN (A$(6)) + LEN (A$(7)))):A$(7)
1850 : PRINT A$(8)
1860 : PRINT B$(2); SPC( 11 - LEN (B$(2))):A$(10);
1870 : PRINT SPC( 33 - LEN (A$(10))):A$(9); SPC( 16 -
LEN (A$(9))):B$(1); PRINT A$(8)
1880 :
1890 : GOSUB 4000
1900 :
1910 : LET Z = 0: Z$ = CHR$ (0)

```

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2530 :
2540 : PRINT D$:CL$:NF$
2550 :
2560 : GOSUB 2590
2570 :
2580 : PRINT "STUDENTS WHOSE PROGRESS IS BEING REPORTED ARE:"
2590 : REM *****
2600 : REM * SCREEN-CLEARING : SUBROUTINE *
2610 : REM *****
2620 :
2630 :
2640 : TEXT : HOME : VTAB 5: PRINT "SCIENCE GRADING PROGRAM
VERSION 5.2": VTAB 9
2650 :
2660 : RETURN
2670 :
2680 : REM *****
2690 : REM * PARAMETER-SETTING : SUBROUTINE *
2700 : REM *****
2710 :
2720 :
2730 : REM IN THIS ROUTINE WE ASSIGN VALUES TO THE TWO VARIABLES
2740 : REM BASSN...BEGINNING ASSIGNMENT NUMBER
2750 : REM FASSN...FINAL ASSIGNMENT NUMBER
2760 : REM WHEN THESE VALUES ARE OBTAINED THE COMPUTER THEN KNOWS
2770 : REM HOW TO ISOLATE EITHER THE DETAILS FILE MATERIAL OR...
2780 : REM THE SCORES THAT WILL BE ADDED TO A GIVEN STUDENTS RECORD.
2790 :
2800 : GOSUB 2590
2810 :
2820 : PRINT "BEGINNING ASSIGNMENT NUMBER "
2830 : VTAB 20: INVERSE : PRINT "TYPE A ZERO (0) IN ORDER TO ACCESS ENTIRE
FILE...": NORMAL
2840 : VTAB 12: PRINT "ENDING ASSIGNMENT NUMBER "
2850 : VTAB 9: HTAB 30: INPUT BASSN
2860 : IF BASSN < 1 THEN BASSN = 1: GOTO 3060
2870 : VTAB 12: HTAB 30: INPUT FASSN
2880 : VTAB 20: PRINT LEFT$ (BL$,80)
2890 : VTAB 20: PRINT "IS THIS A NEW FILE? (Y/N)"; INPUT ANSWER$
2900 : IF LEFT$ (ANSWER$,1) = "Y" THEN 2960
2910 : PRINT D$:OP$:DF$:L$:D1$:V$
2920 : PRINT D$:RF$:DF$:R$: "0"
2930 : INPUT FSSN
2940 : PRINT D$:CL$:DF$
2950 : IF FASSN < = FSSN THEN 3000
2960 : PRINT D$:OP$:DF$:L$:D1$:V$
2970 : PRINT D$:RF$:DF$:R$: "0"
2980 : PRINT FASSN
2990 : PRINT D$:CL$:DF$
3000 : VTAB 20: PRINT LEFT$ (BL$,80)
3010 : VTAB 20: PRINT "IS DISPLAY CORRECT? (Y/N)"; INPUT Y$
3020 : IF LEFT$ (Y$,1) = "N" THEN 2850
3030 :
3040 : RETURN
3050 :
3060 : PRINT D$:OP$:DF$:L$:D1$:V$
3070 : PRINT D$:RF$:DF$:R$: "0"
3080 : INPUT FASSN
3090 : PRINT D$:CL$:DF$
3100 : VTAB 9: HTAB 31: PRINT BASSN
3110 : VTAB 12: HTAB 31: PRINT FASSN
3120 : GOTO 3000
3130 :
3140 : REM *****
3150 : REM * ID # PARAMETER-SETTING : SUBROUTINE *
3160 : REM *****

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3170 :
3180 :
3190 REM      IN THIS ROUTINE WE ASSIGN VALUES TO THE TWO VARIABLES
3200 REM      BID...BEGINNING IDENTIFICATION NUMBER
3210 REM      FID...FINAL IDENTIFICATION NUMBER
3220 REM      WHEN THESE VALUES ARE OBTAINED THE COMPUTER KNOWS
3230 REM      HOW TO ISOLATE THE SCORES FILE MATERIAL...
3240 :
3250 :
3260 : GOSUB 2590
3270 :
3280 : PRINT "PLEASE ENTER THE STUDENT I.D. NUMBERS OF:"
3290 : PRINT "THE FIRST AND FINAL STUDENTS ON YOUR  ROSTER LIST..."
3300 : VTAB 20: INVERSE : PRINT "TYPE A ZERO (0) TO ACCESS ENTIRE FILE."
      : NORMAL
3310 : VTAB 13: PRINT "ENTER BEGINNING STUDENT ID#: "
3320 : VTAB 15: PRINT "ENTER FINAL STUDENT ID#:  "
3330 : VTAB 13: HTAB 31: INPUT BID
3340 : IF BID < 1 THEN BID = 1: GOTO 3540
3350 : VTAB 15: HTAB 31: INPUT FID
3360 : VTAB 20: PRINT LEFT$ (BL$,80)
3370 : VTAB 20: PRINT "IS THIS A NEW FILE? (Y/N)": INPUT ANSWER$
3380 : IF LEFT$ (ANSWER$,1) = "Y" THEN 3440
3390 : PRINT D$:OP$:NF$:LS$:DI$:V$
3400 : PRINT D$:RF$:NF$:R$: "0"
3410 : INPUT FD
3420 : PRINT D$:CL$:NF$
3430 : IF FID < = FD THEN 3480
3440 : PRINT D$:OP$:NF$:LS$:DI$:V$
3450 : PRINT D$:WF$:NF$:R$: "0"
3460 : PRINT FID
3470 : PRINT D$:CL$:NF$
3480 : VTAB 20: PRINT LEFT$ (BL$,80)
3490 : VTAB 20: PRINT "IS DISPLAY CORRECT? (Y/N)": INPUT Y$
3500 : IF LEFT$ (Y$,1) = "N" THEN 3330
3510 :
3520 RETURN
3530 :
3540 : PRINT D$:OP$:NF$:LS$:DI$:V$
3550 : PRINT D$:RF$:NF$:R$: "0"
3560 : INPUT FID
3570 : PRINT D$:CL$:NF$
3580 : VTAB 13: HTAB 32: PRINT BID
3590 : VTAB 15: HTAB 32: PRINT FID
3600 : GOTO 3480
3610 :
3620 REM      *****
3630 REM      *  ROSTER FILE MENU : SUBROUTINE  *
3640 REM      *****
3650 :
3660 REM      THIS SUBROUTINE WILL BE USED SEVERAL TIMES
3670 :
3680 : PRINT "*****ROSTERS FILE SELECTION*****":
3690 : PRINT " "
3700 : PRINT "1. CLASS : SECTION NUMBER ONE "
3710 : PRINT " "
3720 : PRINT "2. CLASS : SECTION NUMBER TWO "
3730 : PRINT " "
3740 : PRINT "3. CLASS : SECTION NUMBER THREE "
3750 : PRINT " "
3760 : PRINT "4. CLASS : SECTION NUMBER FOUR "
3770 : PRINT " "
3780 : PRINT "5. CLASS : SECTION NUMBER FIVE "
3790 : PRINT " "
3800 : PRINT "6. CLASS : SECTION NUMBER SIX "
3810 : PRINT " "

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4410 : IF OAAVG < 75 THEN C2$ = "F"
4420 :
4430 RETURN
4440 : LET G1 = (G1 + 1)
4450 : IF R < FASSN THEN NEXT R
4460 : IF R > = FASSN THEN 4250
4470 : LET H1 = (H1 + 1)
4480 : IF C < FASSN THEN NEXT C
4490 : IF C > = FASSN THEN 4380
4500 :
4510 :

```

Administration Notification

```

1000 REM      *****
1010 REM      *  GRADES-RELEASE : SUBROUTINE  *
1020 REM      *****
1030 :
1040 REM      IN THIS SUBROUTINE WE ATTEMPT TO PREPARE
1050 REM      A COHERENT REPORT ON THE PROGRESS OF EACH
1060 REM      STUDENT ON ONE SINGLE PAGE
1070 :
1080 : HOME : VTAB 3
1090 : GOSUB 3080
1100 :
1110 : GOSUB 2600
1120 :
1130 : GOSUB 2140
1140 :
1150 : PRINT D$:OP$:NF$:LS$:DI$:V$
1160 :
1170 : FOR G = BID TO FID
1180 : PRINT D$:RF$:NF$:R$:G
1190 : INPUT N$(G)
1200 : NEXT G
1210 :
1220 : PRINT D$:CL$:NF$
1230 :
1240 : GOSUB 2050
1250 :
1260 : PRINT "STUDENTS WHOSE PROGRESS IS BEING REPORTED ARE:"
1270 :
1280 : FOR G = BID TO FID
1290 : PRINT "STUDENT #":G;" IS: "; LEFT$ (N$(G),20)
1300 : IF G = 20 THEN CALL - 715
1310 : IF G = 40 THEN CALL - 715
1320 : NEXT G
1330 : PRINT : PRINT "IS DISPLAY CORRECT? (Y/N)":
1340 : INPUT Y$
1350 : IF LEFT$ (Y$,1) = "N" THEN 1000
1360 :
1370 : GOSUB 2050
1380 :
1390 : INPUT "ENTER DATE OF GRADES-RELEASE REPORT: "A$(3)
1400 : LET A$(1) = "*****STUDENT PROGRESS
      NOTIFICATION*****"
1410 : LET A$(2) = "EISENHOWER JUNIOR HIGH SCHOOL"
1420 : LET A$(4) = "1410 75TH STREET"
1430 : LET A$(5) = "TEACHER: MR. ERIC G. VANN"
1440 : LET A$(6) = "DARIEN, IL 60559"
1450 : LET A$(7) = "PRINCIPAL: MR. JOHN C. NOTHACKER"
1460 : LET A$(8) = "*****"
      *****
1470 : LET B$(1) = "NAMES"
1480 : LET B$(2) = "TEST AVG."

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2100 : TEXT : HOME : VTAB 5: PRINT "SCIENCE GRADING PROGRAM
      VERSION 5.2": VTAB 9
2110 :
2120 RETURN
2130 :
2140 REM      *****
2150 REM      *  PARAMETER-SETTING : SUBROUTINE  *
2160 REM      *****
2170 :
2180 :
2190 REM      IN THIS ROUTINE WE ASSIGN VALUES TO THE TWO VARIABLES
2200 REM      BASSN...BEGINNING ASSIGNMENT NUMBER
2210 REM      FASSN...FINAL ASSIGNMENT NUMBER
2220 REM      WHEN THESE VALUES ARE OBTAINED THE COMPUTER THEN KNOWS
2230 REM      HOW TO ISOLATE EITHER THE DETAILS FILE MATERIAL OR...
2240 REM      THE SCORES THAT WILL BE ADDED TO A GIVEN STUDENTS RECORD.
2250 :
2260 : GOSUB 2050
2270 :
2280 : PRINT "BEGINNING ASSIGNMENT NUMBER "
2290 : VTAB 20: INVERSE : PRINT "TYPE A ZERO (0) IN ORDER TO ACCESS
      ENTIRE FILE...": NORMAL
2300 : VTAB 12: PRINT "ENDING ASSIGNMENT NUMBER  "
2310 : VTAB 9: HTAB 30: INPUT BASSN
2320 : IF BASSN < 1 THEN BASSN = 1: GOTO 2520
2330 : VTAB 12: HTAB 30: INPUT FASSN
2340 : VTAB 20: PRINT LEFT$ (BL$,80)
2350 : VTAB 20: PRINT "IS THIS A NEW FILE? (Y/N)": INPUT ANSWER$
2360 : IF LEFT$ (ANSWER$,1) = "Y" THEN 2420
2370 : PRINT D$:OP$:DF$:L$:DI$:V$
2380 : PRINT D$:RF$:DF$:R$: "0"
2390 : INPUT FSN
2400 : PRINT D$:CL$:DF$
2410 : IF FASSN < = FSN THEN 2460
2420 : PRINT D$:OP$:DF$:L$:DI$:V$
2430 : PRINT D$:WF$:DF$:R$: "0"
2440 : PRINT FASSN
2450 : PRINT D$:CL$:DF$
2460 : VTAB 20: PRINT LEFT$ (BL$,80)
2470 : VTAB 20: PRINT "IS DISPLAY CORRECT? (Y/N)": INPUT Y$
2480 : IF LEFT$ (Y$,1) = "N" THEN 2310
2490 :
2500 RETURN
2510 :
2520 : PRINT D$:OP$:DF$:L$:DI$:V$
2530 : PRINT D$:RF$:DF$:R$: "0"
2540 : INPUT FASSN
2550 : PRINT D$:CL$:DF$
2560 : VTAB 9: HTAB 31: PRINT BASSN
2570 : VTAB 12: HTAB 31: PRINT FASSN
2580 : GOTO 2460
2590 :
2600 REM      *****
2610 REM      *  ID #  PARAMETER-SETTING : SUBROUTINE  *
2620 REM      *****
2630 :
2640 :
2650 REM      IN THIS ROUTINE WE ASSIGN VALUES TO THE TWO VARIABLES
2660 REM      BID...BEGINNING IDENTIFICATION NUMBER
2670 REM      FID...FINAL IDENTIFICATION NUMBER
2680 REM      WHEN THESE VALUES ARE OBTAINED THE COMPUTER KNOWS
2690 REM      HOW TO ISOLATE THE SCORES FILE MATERIAL...
2700 :
2710 :
2720 : GOSUB 2050
2730 :

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3820 : PRINT "*****";
3830 : PRINT
3840 : PRINT " TYPE NUMBER OF YOUR SELECTION (1-6)";
3850 :
3860 : INPUT NF$
3870 :
3880 : IF NF$ = CHR$(13) THEN 3860
3890 : IF NF$ > CHR$(54) OR NF$ < CHR$(49) THEN 3860
3900 : IF NF$ = "1" THEN NF$ = "NAMES CLASS #1":DF$ = "CLASS #1":GF$ =
    "GRADES CLASS #1"
3910 : IF NF$ = "2" THEN NF$ = "NAMES CLASS #2":DF$ = "CLASS #2":GF$ =
    "GRADES CLASS #2"
3920 : IF NF$ = "3" THEN NF$ = "NAMES CLASS #3":DF$ = "CLASS #3":GF$ =
    "GRADES CLASS #3"
3930 : IF NF$ = "4" THEN NF$ = "NAMES CLASS #4":DF$ = "CLASS #4":GF$ =
    "GRADES CLASS #4"
3940 : IF NF$ = "5" THEN NF$ = "NAMES CLASS #5":DF$ = "CLASS #5":GF$ =
    "GRADES CLASS #5"
3950 : IF NF$ = "6" THEN NF$ = "NAMES CLASS #6":DF$ = "CLASS #6":GF$ =
    "GRADES CLASS #6"
3960 :
3970 : RETURN
3980 :
3990 :
4000 REM *****
4010 REM * AVERAGES CALCULATING : SUBROUTINE *
4020 REM *****
4030 :
4040 :
4050 REM IN THIS SUBROUTINE THE VARIABLES ARE AS FOLLOWS:
4060 REM C1 AND C2 = NUMBER OF TEST OR HOMEWORK SCORES, RESPECTIVELY
4070 REM TGD AND HG = SUM OF TEST AND HOMEWORK SCORES, RESPECTIVELY
4080 REM TA, HA AND OAAVG = THE TEST, HOMEWORK AND OVERALL AVERGES,
    RESPECTIVELY
4090 REM COMMENT$ = COMMENT WHEN STUDENT OAAVG < 70 PERCENT
4100 :
4110 :
4120 : LET C1 = 0:C2 = 0:G1 = 0:TGD = 0:HG = 0:C1$ = "":C2$ = "":
    TA = 0:HA = 0:OAAVG = 0
4130 :
4140 : FOR R = BASSN TO FASSN
4150 : IF RIGHT$(GD$(R),1) < "T" THEN 4210
4160 : IF GD$(R) = "N/GT" THEN C1$ = " (INC.)": GOTO 4440
4170 : IF GD$(R) = "N/AT" THEN GOTO 4440
4180 : LET C1 = (C1 + 1)
4190 : LET G1 = (G1 + 1)
4200 : LET TGD = VAL (GD$(R)) + TGD
4210 : NEXT R
4220 :
4230 : IF C1 < 1 THEN 4270
4240 :
4250 : LET TA = TGD / C1
4260 :
4270 : FOR C = BASSN TO FASSN
4280 : IF RIGHT$(GD$(C),1) < "H" THEN 4340
4290 : IF GD$(C) = "N/GH" THEN C1$ = " (INC.)": GOTO 4470
4300 : IF GD$(C) = "N/AH" THEN GOTO 4470
4310 : LET C2 = (C2 + 1)
4320 : LET H1 = (H1 + 1)
4330 : LET HG = VAL (GD$(C)) + HG
4340 : NEXT C
4350 :
4360 : IF C2 < 1 THEN 4390
4370 :
4380 : LET HA = HG / C2
4390 : LET OAAVG = (HA + TA) / 2
4400 : IF OAAVG < 80 AND OAAVG > 75 THEN C2$ = "D"

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1490 : LET B$(3) = "HOMEWORK AVG."
1500 : LET B$(4) = "OVERALL AVG."
1510 : LET B$(5) = "COMMENTS"
1520 : LET B$(6) = "ID#"
1530 :
1540 : PRINT D$:"PR#1"
1550 : PRINT CHR$(27):"91"
1560 : PRINT CHR$(27):"6"
1570 : PRINT SPC(80 - LEN (DF$)):DF$
1580 : PRINT A$(1)
1590 : PRINT A$(2): SPC(80 - (LEN (A$(2)) + LEN (A$(3)))):A$(3)
1600 : PRINT A$(4): SPC(80 - (LEN (A$(4)) + LEN (A$(5)))):A$(5)
1610 : PRINT A$(6): SPC(80 - (LEN (A$(6)) + LEN (A$(7)))):A$(7)
1620 : PRINT A$(8)
1630 : PRINT B$(6): SPC(4 - LEN (B$(6))):B$(1): SPC(16 -
    LEN (B$(1))):B$(2):
1640 : PRINT SPC(12 - LEN (B$(2))):B$(3):
1650 : PRINT SPC(16 - LEN (B$(3))):B$(4): SPC(16 - LEN (B$(4))):B$(5)
1660 : PRINT A$(8)
1670 :
1680 : FOR G = BID TO FID
1690 :
1700 : PRINT D$:OP$:GF$:L$:D2$:V$
1710 :
1720 : FOR R = BASSN TO FASSN
1730 : PRINT D$:RF$:GF$:R$: VAL (RIGHT$(N$(G),2)):BY$
    :(-4 + (R * 5))
1740 : INPUT GD$(R)
1750 : NEXT R
1760 :
1770 : PRINT D$:CL$:GF$
1780 :
1790 : GOSUB 3460
1800 :
1810 :
1820 : PRINT G: SPC(4 - LEN (STR$(G))):
1830 : PRINT LEFT$(N$(G),14): SPC(16 - LEN (LEFT$(N$(G),14))):
1840 : PRINT INT (100 * TA) / 100: SPC(12 - LEN (STR$(INT (100 * TA)
    / 100))):
1850 : PRINT INT (100 * HA) / 100: SPC(16 - LEN (STR$(INT (100 * HA)
    / 100))):
1860 : PRINT INT (100 * OAAVG) / 100: SPC(16 - LEN (STR$(INT (100 *
    OAAVG) / 100))):C2$:C1$
1870 :
1880 :
1890 : NEXT G
1900 :
1910 : PRINT A$(8)
1920 : PRINT "# TEST GRADES =" :G1:
1930 : PRINT SPC(5):"# HOMEWORK GRADES =" :H1:
1940 : PRINT SPC(10):"TOTAL # ASSIGNMENTS =" : (G1 + H1)
1950 : PRINT A$(8)
1960 : PRINT "COPIES TO BE SENT TO:"
1970 : PRINT "GUIDANCE COUNSELOR: MR. JOSEPH O. PEDERSEN"
1980 : PRINT "ASS'T PRINCIPAL: MR. CHARLES W. GRAY"
1990 : PRINT CHR$(11)
2000 : PRINT D$:"PR#0"
2010 :
2020 : PRINT CHR$(4):"RUN HELLO:D1"
2030 :
2040 :
2050 REM *****
2060 REM * SCREEN-CLEARING : SUBROUTINE *
2070 REM *****
2080 :
2090 :

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2740 : PRINT "PLEASE ENTER THE STUDENT I.D. NUMBERS OF:"
2750 : PRINT "THE FIRST AND FINAL STUDENTS ON YOUR ROSTER LIST..."
2760 : VTAB 20: INVERSE : PRINT "TYPE A ZERO (0) TO ACCESS ENTIRE FILE.":
    NORMAL
2770 : VTAB 13: PRINT "ENTER BEGINNING STUDENT ID#:"
2780 : VTAB 15: PRINT "ENTER FINAL STUDENT ID#:"
2790 : VTAB 13: INPUT BID
2800 : IF BID < 1 THEN BID = 1: GOTO 3000
2810 : VTAB 15: HTAB 31: INPUT FID
2820 : VTAB 20: PRINT LEFT$(BL$,80)
2830 : VTAB 20: PRINT "IS THIS A NEW FILE? (Y/N)": INPUT ANSWER$
2840 : IF LEFT$(ANSWER$,1) = "Y" THEN 2900
2850 : PRINT D$:OP$:NF$:LS$:D1$:V$
2860 : PRINT D$:RF$:NF$:R$: "0"
2870 : INPUT FD
2880 : PRINT D$:CL$:NF$
2890 : IF FID < = FD THEN 2940
2900 : PRINT D$:OP$:NF$:LS$:D1$:V$
2910 : PRINT D$:WF$:NF$:R$: "0"
2920 : PRINT FID
2930 : PRINT D$:CL$:NF$
2940 : VTAB 20: PRINT LEFT$(BL$,80)
2950 : VTAB 20: PRINT "IS DISPLAY CORRECT? (Y/N)": INPUT Y$
2960 : IF LEFT$(Y$,1) = "N" THEN 2790
2970 :
2980 : RETURN
2990 :
3000 : PRINT D$:OP$:NF$:LS$:D1$:V$
3010 : PRINT D$:RF$:NF$:R$: "0"
3020 : INPUT FID
3030 : PRINT D$:CL$:NF$
3040 : VTAB 13: HTAB 32: PRINT BID
3050 : VTAB 15: HTAB 32: PRINT FID
3060 : GOTO 2940
3070 :
3080 REM *****
3090 REM * ROSTER FILE MENU : SUBROUTINE *
3100 REM *****
3110 :
3120 REM THIS SUBROUTINE WILL BE USED SEVERAL TIMES
3130 :
3140 : PRINT "*****ROSTERS FILE SELECTION*****"
3150 : PRINT "*"
3160 : PRINT "* 1. CLASS : SECTION NUMBER ONE"
3170 : PRINT "*"
3180 : PRINT "* 2. CLASS : SECTION NUMBER TWO"
3190 : PRINT "*"
3200 : PRINT "* 3. CLASS : SECTION NUMBER THREE"
3210 : PRINT "*"
3220 : PRINT "* 4. CLASS : SECTION NUMBER FOUR"
3230 : PRINT "*"
3240 : PRINT "* 5. CLASS : SECTION NUMBER FIVE"
3250 : PRINT "*"
3260 : PRINT "* 6. CLASS : SECTION NUMBER SIX"
3270 : PRINT "*"
3280 : PRINT "*****"
3290 : PRINT
3300 : PRINT " TYPE NUMBER OF YOUR SELECTION (1-6)";
3310 :
3320 : INPUT NF$
3330 :
3340 : IF NF$ = CHR$(13) THEN 3320
3350 : IF NF$ > CHR$(54) OR NF$ < CHR$(49) THEN 3320
3360 : IF NF$ = "1" THEN NF$ = "NAMES CLASS #1":DF$ = "CLASS #1":
    GF$ = "GRADES CLASS #1"

```



```

3370 : IF NF$ = "2" THEN NF$ = "NAMES CLASS #2":DF$ = "CLASS #2":
GF$ = "GRADES CLASS #2"
3380 : IF NF$ = "3" THEN NF$ = "NAMES CLASS #3":DF$ = "CLASS #3":
GF$ = "GRADES CLASS #3"
3390 : IF NF$ = "4" THEN NF$ = "NAMES CLASS #4":DF$ = "CLASS #4":
GF$ = "GRADES CLASS #4"
3400 : IF NF$ = "5" THEN NF$ = "NAMES CLASS #5":DF$ = "CLASS #5":
GF$ = "GRADES CLASS #5"
3410 : IF NF$ = "6" THEN NF$ = "NAMES CLASS #6":DF$ = "CLASS #6":
GF$ = "GRADES CLASS #6"
3420 :
3430 RETURN
3440 :
3450 :
3460 REM *****
3470 REM * AVERAGES CALCULATING : SUBROUTINE *
3480 REM *****
3490 :
3500 :
3510 REM IN THIS SUBROUTINE THE VARIABLES ARE AS FOLLOWS:
3520 REM C1 AND C2 = NUMBER OF TEST OR HOMEWORK SCORES, RESPECTIVELY
3530 REM TGD AND HG = SUM OF TEST AND HOMEWORK SCORES, RESPECTIVELY
3540 REM TA, HA AND OAAVG = THE TEST, HOMEWORK AND OVERALL AVERGES,
RESPECTIVELY
3550 REM COMMENT$ = COMMENT WHEN STUDENT OAAVG < 70 PERCENT
3560 :
3570 :
3580 : LET C1 = 0:C2 = 0:G1 = 0:TGD = 0:HG = 0:C1$ = " ":C2$ = " ":
TA = 0:HA = 0:OAAVG = 0
3590 :
3600 : FOR R = BASSN TO FASSN
3610 : IF RIGHT$(GD$(R),1) < > "T" THEN 3670
3620 : IF GD$(R) = "N/GT" THEN C1$ = " (INC.):" GOTO 3900
3630 : IF GD$(R) = "N/AT" THEN GOTO 3900
3640 : LET C1 = (C1 + 1)
3650 : LET G1 = (G1 + 1)
3660 : LET TGD = VAL (GD$(R)) + TGD
3670 : NEXT R
3680 :
3690 : IF C1 < 1 THEN 3730
3700 :
3710 : LET TA = TGD / C1
3720 :
3730 : FOR C = BASSN TO FASSN
3740 : IF RIGHT$(GD$(C),1) < > "H" THEN 3800
3750 : IF GD$(C) = "N/GH" THEN C1$ = " (INC.):" GOTO 3930
3760 : IF GD$(C) = "N/AH" THEN GOTO 3930
3770 : LET C2 = (C2 + 1)
3780 : LET H1 = (H1 + 1)
3790 : LET HG = VAL (GD$(C)) + HG
3800 : NEXT C
3810 :
3820 : IF C2 < 1 THEN 3850
3830 :
3840 : LET HA = HG / C2
3850 : LET OAAVG = (HA + TA) / 2
3860 : IF OAAVG < 80 AND OAAVG > = 75 THEN C2$ = "D"
3870 : IF OAAVG < 75 THEN C2$ = "F"
3880 :
3890 RETURN
3900 : LET G1 = (G1 + 1)
3910 : IF R < FASSN THEN NEXT R
3920 : IF R > FASSN THEN 3710

```

```

1530 : GOSUB 2450
1540 :
1550 : PRINT D$:OP$:NF$:LS$:DI$:V$
1560 :
1570 : FOR G = BID TO FID
1580 : PRINT D$:WF$:NF$:R$:G
1590 : PRINT N$(G)
1600 : NEXT G
1610 :
1620 : PRINT D$:CL$:NF$
1630 :
1640 : FOR G = BID TO FID
1650 : PRINT "STUDENT: #":G: IS ":LEFT$(N$(G),20)
1660 : IF G = 20 THEN CALL - /15
1670 : IF G = 40 THEN CALL - 715
1680 : NEXT G
1690 :
1700 : PRINT : PRINT : PRINT : VTAB 22: INVERSE : PRINT "CHECK THE UPDATED
ROSTER...": NORMAL
1710 : PRINT "IS EVERYTHING ENTERED CORRECTLY (Y/N)":
1720 : INPUT Y$
1730 : IF LEFT$(Y$,1) = "N" THEN 1000
1740 :
1750 : PRINT D$:OP$:NF$:LS$:DI$:V$
1760 : PRINT D$:WF$:NF$:R$:G
1770 : PRINT FID
1780 : PRINT D$:CL$:NF$
1790 :
1800 : VTAB 22: PRINT LEFT$(BL$,80)
1810 : VTAB 22: PRINT "DO YOU WISH TO EDIT MORE? (Y/N)":
1820 : INPUT Y$
1830 : IF LEFT$(Y$,1) = "Y" THEN 1000
1840 :
1850 : PRINT CHR$(4):"RUN HELLO"
1860 :
1870 :
1880 REM *****
1890 REM * SCREEN-CLEARING : SUBROUTINE *
1900 REM *****
1910 :
1920 :
1930 : TEXT : HOME : VTAB 5: PRINT "SCIENCE GRADING PROGRAM
VERSION 5.2": VTAB 9
1940 :
1950 RETURN
1960 :
1970 REM *****
1980 REM * ID # PARAMETER-SETTING : SUBROUTINE *
1990 REM *****
2000 :
2010 :
2020 REM IN THIS ROUTINE WE ASSIGN VALUES TO THE TWO VARIABLES
2030 REM BID...BEGINNING IDENTIFICATION NUMBER
2040 REM FID...FINAL IDENTIFICATION NUMBER
2050 REM WHEN THESE VALUES ARE OBTAINED THE COMPUTER KNOWS
2060 REM HOW TO ISOLATE THE SCORES FILE MATERIAL...
2070 :
2080 :
2090 : GOSUB 1880
2100 :
2110 : PRINT "PLEASE ENTER THE STUDENT I.D. NUMBERS OF":
2120 : PRINT "THE FIRST AND FINAL STUDENTS ON YOUR ROSTER LIST..."

```

```

2750 : GOSUB 1880: PRINT " YOUR SORT IS OVER..."
2760 :
2770 : PRINT
2780 : PRINT FID:" RANDOM NAMES"
2790 : PRINT C1:" COMPARISONS"
2800 : PRINT S1:" SWAPS"
2810 :
2820 RETURN
2830 :
2840 :
2850 REM *****
2860 REM * ROSTER FILE MENU : SUBROUTINE *
2870 REM *****
2880 :
2890 REM THIS SUBROUTINE WILL BE USED SEVERAL TIMES
2900 :
2910 : PRINT "*****ROSTERS FILE SELECTION*****":
2920 : PRINT "*"
2930 : PRINT "* 1. CLASS : SECTION NUMBER ONE"
2940 : PRINT "*"
2950 : PRINT "* 2. CLASS : SECTION NUMBER TWO"
2960 : PRINT "*"
2970 : PRINT "* 3. CLASS : SECTION NUMBER THREE"
2980 : PRINT "*"
2990 : PRINT "* 4. CLASS : SECTION NUMBER FOUR"
3000 : PRINT "*"
3010 : PRINT "* 5. CLASS : SECTION NUMBER FIVE"
3020 : PRINT "*"
3030 : PRINT "* 6. CLASS : SECTION NUMBER SIX"
3040 : PRINT "*"
3050 : PRINT "*****"
3060 : PRINT
3070 : PRINT " TYPE NUMBER OF YOUR SELECTION (1-6)":
3080 :
3090 : INPUT NF$
3100 :
3110 : IF NF$ = CHR$(13) THEN 3090
3120 : IF NF$ > CHR$(54) OR NF$ < CHR$(49) THEN 3090
3130 : IF NF$ = "1" THEN NF$ = "NAMES CLASS #1":DF$ = "CLASS #1":
GF$ = "GRADES CLASS #1"
3140 : IF NF$ = "2" THEN NF$ = "NAMES CLASS #2":DF$ = "CLASS #2":
GF$ = "GRADES CLASS #2"
3150 : IF NF$ = "3" THEN NF$ = "NAMES CLASS #3":DF$ = "CLASS #3":
GF$ = "GRADES CLASS #3"
3160 : IF NF$ = "4" THEN NF$ = "NAMES CLASS #4":DF$ = "CLASS #4":
GF$ = "GRADES CLASS #4"
3170 : IF NF$ = "5" THEN NF$ = "NAMES CLASS #5":DF$ = "CLASS #5":
GF$ = "GRADES CLASS #5"
3180 : IF NF$ = "6" THEN NF$ = "NAMES CLASS #6":DF$ = "CLASS #6":
GF$ = "GRADES CLASS #6"
3190 :
3200 RETURN
3210 :
3220 :
3230 REM *****
3240 REM * ROSTERS FILE DELETION : SUBROUTINE *
3250 REM *****
3260 :
3270 :
3280 REM THIS SUBROUTINE WILL DELETE AND COMPACT THE ROSTERS FILE
FROM WHICH
3290 REM ONE OR MORE NAMES HAVE BEEN DELETED (ONE AT A TIME)

```


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```

2130 :***** VTABLE 20: INVERSE = PRINT "TYPE A ZERO (0) TO ACCESS ENTIRE FILE.:"
      NORMAL
2140 :***** VTABLE 13: PRINT "ENTER BEGINNING STUDENT ID#: "
2150 :***** VTABLE 15: PRINT "ENTER FINAL STUDENT ID#: "
2160 :***** VTABLE 13: HTAB 31: INPUT BID
2170 :***** IF BID < 1 THEN BID = 1: GOTO 2370
2180 :***** VTABLE 15: HTAB 31: INPUT FID
2190 :***** VTABLE 20: PRINT LEFT$(BL$,80)
2200 :***** VTABLE 20: PRINT "IS THIS A NEW FILE? (Y/N)":" INPUT ANSWER$
2210 :***** IF LEFT$(ANSWER$,1) = "Y" THEN 2270
2220 :***** PRINT D$;OP$;NF$;LS$;D1$;V$
2230 :***** PRINT D$;RF$;NF$;R$;"0"
2240 :***** INPUT FD
2250 :***** PRINT D$;CL$;NF$
2260 :***** IF FID < = FD THEN 2310
2270 :***** PRINT D$;OP$;NF$;LS$;D1$;V$
2280 :***** PRINT D$;MF$;NF$;R$;"0"
2290 :***** PRINT FID
2300 :***** PRINT D$;CL$;NF$
2310 :***** VTABLE 20: PRINT LEFT$(BL$,80)
2320 :***** VTABLE 20: PRINT "IS DISPLAY CORRECT? (Y/N)":" INPUT Y$
2330 :***** IF LEFT$(Y$,1) = "N" THEN 2160
2340 :
2350 RETURN
2360 :
2370 :***** PRINT D$;OP$;NF$;LS$;D1$;V$
2380 :***** PRINT D$;RF$;NF$;R$;"0"
2390 :***** INPUT FID
2400 :***** PRINT D$;CL$;NF$
2410 :***** VTABLE 13: HTAB 32: PRINT BID
2420 :***** VTABLE 15: HTAB 32: PRINT FID
2430 :***** GOTO 2310
2440 :
2450 REM *****
2460 REM * QUICKSORT : SUBROUTINE *
2470 REM *****
2480 :
2490 :
2500 REM THIS PARTICULAR ROUTINE IS ADAPTED FROM
2510 REM THAT FOR NUMBERS PUBLISHED IN "BASIC AND THE PERSONAL COMPUTER
2520 REM WRITTEN BY THOMAS A. DAVNER
2530 REM PUBLISHED BY ADDISON-WESLEY COPYRIGHT 1978
2540 REM ISBN0-201-01589-7
2550 :
2560 :***** LET C1 = 0:S1 = 0:P = 1
2570 :***** LET I1 = BID:J1 = FID
2580 :***** LET I = I1:J = J1:S = - 1
2590 :***** LET C1 = C1 + 1
2600 :***** IF N$(I1) < = N$(J1) THEN 2640
2610 :***** LET S1 = S1 + 1
2620 :***** LET T$ = N$(I1):N$(I1) = N$(J1):N$(J1) = T$
2630 :***** LET S = SGN (- S)
2640 :***** IF S = 1 THEN I = I + 1
2650 :***** IF S < > 1 THEN J = J - 1
2660 :***** IF I < J THEN 2590
2670 :***** IF I + 1 > = J1 THEN 2690
2680 :***** LET P = P + 1:S9(P,1) = I + 1:S9(P,2) = J1
2690 :***** LET J1 = I - 1
2700 :***** IF I1 < J1 THEN 2580
2710 :***** IF P = 0 THEN 2750
2720 :***** LET I1 = S9(P,1):J1 = S9(P,2):P = P - 1
2730 :***** GOTO 2580
2740 :

```

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How to Save Memory, Time and Your Fingers

—BY DAVID LUBAR—

Programs published in an expanded form are easy to follow and modify. But when it's time to type them in, a little planning can save you a lot of work. In this article I'll discuss various methods for developing algorithms that can be used to condense programs. The basic approach is the same one you'd use for solving arithmetic progression puzzles.

Consider the following subroutine:

```
100 IF X=1 THEN Z=9:GOTO 300
110 IF X=2 THEN Z=15:GOTO 300
120 IF X=3 THEN Z=21:GOTO 300
130 IF X=4 THEN Z=27:GOTO 300
140 IF X=5 THEN Z=33:GOTO 300
300 RETURN
```

First, look for arithmetic relationships in the individual variables. In this example X increases by 1 while Z increases by 6. Part of the algorithm will probably involve multiplying X by 6. This produces a value that is three less than required. Adding the difference, the formula becomes $Z=6*X+3$. (Since the computer performs multiplication before addition, no parentheses are needed.) So the subroutine can be replaced with:

```
100 Z=6*X+3:RETURN
```

Some cases, of course, are trickier. In many games programs, the value of one variable will depend on the range of another variable. Subroutines to determine scores often function in this manner. For example:

```
10 IF X<5 THEN Z=1:GOTO 100
20 IF X<10 THEN Z=3:GOTO 100
30 IF X<15 THEN Z=5:GOTO 100
40 IF X<20 THEN Z=7:GOTO 100
50 IF X<25 THEN Z=9:GOTO 100
100 RETURN
```

One approach, if simple inspection doesn't reveal an algorithm, is to make a chart of the values of the variables.

X from	Z=
0 to 4	1
5 to 9	3
10 to 14	5
15 to 19	7
20 to 24	9

Here, X has a range of 5 for each value of Z. What we need is a way to turn each range of X into a single value. This can be done using division and the INT function. Division by 5 will produce a result that is one integer greater for each range of X, and the INT function will lop off any fractional remainder. Making another chart, we get:

X from	INT(X/5)=	Z=
0 to 4	0	1
5 to 9	1	3
10 to 14	2	5
15 to 19	3	7
20 to 24	4	9

Now we have a simple relation similar to the one in the first example. Z increases at twice the rate of INT(X/5), and the initial value of Z is 1 greater than that of INT(X/5). Putting it all together, the algorithm is $Z=2*INT(X/5)+1$.

Unfortunately, not all programs use such easily converted formulas. Sometimes, while the range of X values might be consistent, there will be a problem with the starting point. Delete line 10 from the second example. Now, the first line of the chart becomes:

X from	Z=
0 to 9	3

While the algorithm still works for the other values, it won't work here since INT(X/5) could equal 0 or 1. The simplest way around this would be to add the line 10 IF X<5 THEN X=X-5. But this could produce a second problem; if the value of X is used in another part of the program, changing X will alter later results. To prevent this, use another variable:

```
10 Y=X:IF Y<5 THEN Y=5
20 Z=2*INT(Y/5)+1
```

Or, make the fix after using the algorithm.

```
10 Z=2*INT(X/5)+1:IF Z<3 THEN Z=3
```

These examples consist of short subroutines. In such cases, algorithms aren't always worth the trouble. But when you are faced with ten or twenty lines of this nature, an algorithm can be useful. Besides saving memory, it will also increase the program's speed.

Summing it up, the following steps will usually lead to an algorithm.

1. Determine how each variable increases or decreases. Usually the change will be either arithmetical (Your example: 1, 3, 5, 7, 9) or geometrical (2, 4, 8, 16, 32).
2. Look for a relationship between the variables. Again, it will usually be arithmetical or geometrical or a combination of the two.
3. If inequalities are involved, find the range of values, then reduce each range to an integer.
4. If the problem is complex, make a chart.

There is one other less concrete reward to algorithms: the satisfaction derived from solving a problem and finding a better or more elegant approach. □

Apple III Unveiled at NCC

Apple Computer's newest system, the Apple III, is a fully integrated computer system with built-in disk drive, up to 128K bytes of memory, color and black/white video and the ability to accommodate a wide range of peripheral devices.

"The Apple III is a natural extension of the Apple II personal computer and we have enhanced its power and capability while keeping many of the important aspects of the Apple II," said Steven Jobs, Apple cofounder and vice president of marketing. "For example, it offers high-resolution color graphics, sound capability and system modularity for easy expansion. In addition, a special emulation capability in effect lets users convert an Apple III to an Apple II to permit the use of programs developed for the Apple II."

The new Apple III, introduced during the National Computer Conference (NCC) in May, is for use by professional and managerial people. Its features include: an Apple-designed central processor, a self-contained floppy disk drive, a port which supports up to three additional disk drives, a new keyboard design, a larger CRT data display (80 columns), the Sophisticated Operating System (SOS) and minimal RFI emission.

"It brings greatly expanded data manipulation and word processing capability to the personal computer market," Mr. Jobs said.

Two new application packages are offered for use on the Apple III. One, The Information Analyst, is a business tool for planning, forecasting, modeling, pricing, costing, scheduling and budgeting. Apple III Word Processor software, available in late summer, can be used for preparing memos, letters and general typing, long documents, form letters and legal documents.

Many of the benefits of the Apple III are made possible by the new central processor which features a superset of the 6502 instruction set plus other improvements.

Peripheral devices request machine attention by interrupting the CPU which optimizes speed or the CPU may poll peripherals to determine which need attention, minimizing the software required for peripheral control. The new computer also has a built-in, 6-bit, digital-to-analog (d/a) converter which gives high-quality sound for voice or music generation.



The New Keyboard

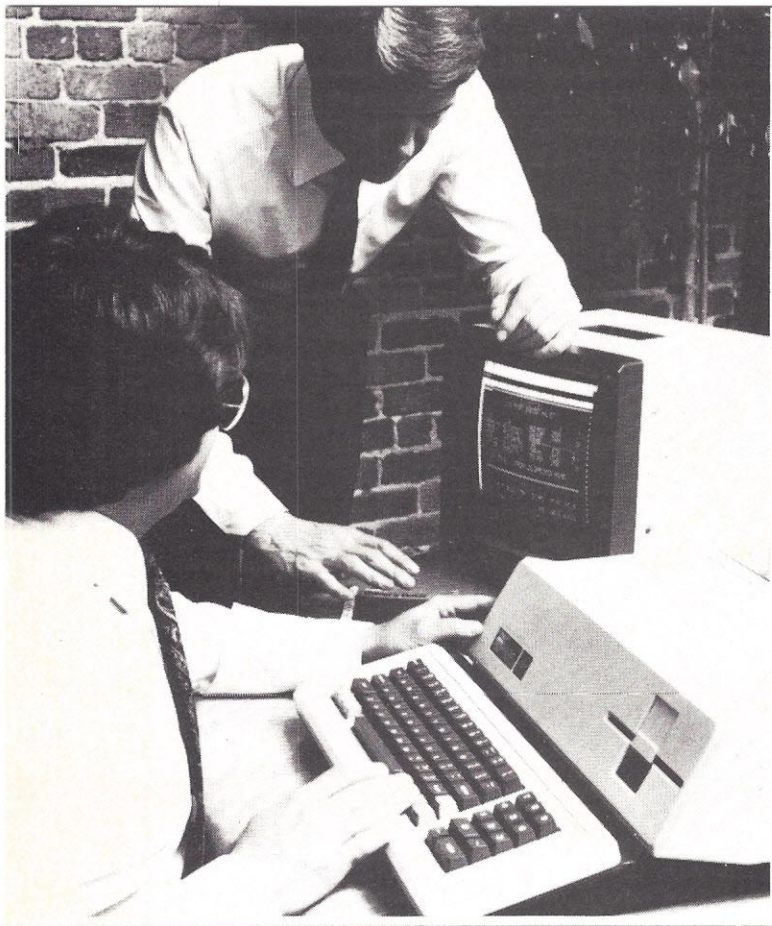
The keyboard has 74 keys and is laid out like a standard typewriter with sculptured key caps which provide a better feel and also reduce glare. Studs on the "D", "K" and "5" keys help orient users. The keyboard includes a 13-key numeric pad for entering numerical data faster and more easily as well as reducing keystrokes when handling tasks requiring intricate commands. This keypad changes function for use with the Word Processor software system. A second set of keycaps is supplied so commands can be initiated with one keystroke.

The system utilizes a lookup table to define what each letter, number or symbol should be specified as each keyboard code comes into the CPU. This permits redefinition of key meanings for handling foreign languages or programming functions into the numeric keypad.

Two Apple function keys are included as well. When pressed before another key, they act as programmable function keys. When pressed after another key, the solid Apple key acts as a high-speed repeat key. An alpha lock key locks only the alphabetical keys into their upper-case modes for compatibility with the Basic programming and the terminal requirements of other computers. Numbers and punctuation marks are not put into upper case with this key but only with the normal shift key.

An auto repeat feature is provided on all keys. Holding a key down makes that letter or number repeat and pressing the solid Apple key will increase the repeat speed. In addition,

Photo Courtesy of Apple Computer, Inc.



four cursor control keys simplify editing.

A number of items which were optional on the Apple II computer have been incorporated as standard equipment in the Apple III. For example, the built-in disk controller handles interaction with the built-in 5-1/4-inch floppy disk drive and has a connector for adding up to three additional disk drives. With the Word Processor system, the second disk drive is included as standard equipment.

Built-in connectors for adding printers are also available on the Apple III. One is a serial port for use with Apple's Silentype thermal printer and the other is an RS-232C port for adding a letter-quality, daisy wheel-type of printer or a modem.

The computer's integral clock and calendar are maintained by their own internal battery to retain time and date references even when the computer is turned off. Apple III can automatically time and data stamp file entries as well.

A built-in 6-bit d/a converter used to generate sound can synthesize simple music and voice sounds for use in alerting the operator to errors in other sound applications.

Graphics

Graphics capabilities provide flexible color graphic data handling on the monitor screen, including color text foreground and background modes useful for highlighting as well as for high-resolution plotting and graphing. The Apple III uses 128 configurable characters and symbols, all RAM-based so they can be loaded from diskettes for changing to different type fonts or to foreign languages.

Three different text modes are provided. One supports 80-character, upper/lower case text with true descenders on lower case characters such as q, p, g and j, which extend below the line for word processing applications. The second supports 40-character color-on-color text, providing the capability to use different foreground and background colors

for each character. This mode allows you to emphasize certain parts of texts for error conditions or highlighting. In addition, the Apple III supports a 40 character black-and-white text mode for use in the Apple II emulation mode.

Several graphics modes are also supported, including an ultra-high resolution black-and-white mode offering a resolution of 560×192 . Another is a high-resolution, 16-color mode offering a 280×192 resolution. This mode permits 16 shades of grey on a black-and-white monitor.

In addition to the built-in peripheral interfaces, the Apple III offers four I/O slots for additional expansion. Optional I/O cards, which will soon be available, include a parallel printer card, an analog interface card and an engineering development card.

The unit's heavy-duty switching power supply permits it to handle several peripherals. The reset key is located behind the main keyboard to prevent accidental system reset and the entire unit has been designed to comply with new FCC standards on radiated interference.

First Two Packages

The Information Analyst consists of an Apple III with 96K bytes of random access memory (RAM). It comes with a built-in 5-1/4-inch floppy disk drive, a new integrated keyboard with a 13-key numeric keypad, two built-in printer interfaces and a 12-inch black-and-white video monitor. Its software includes Apple's Sophisticated Operating System (SOS) as well as management-oriented tools such as Visicalc III, Mail List Manager and Apple Business Basic. The system price is \$4340.

The Word Processor system consists of an Apple III with 96K bytes of memory, integrated keyboard, printer interfaces, a 12-inch black-and-white monitor, and two disk drives — one built-in and one external. The disk drives provide the capacity to store about sixty pages of text per removable floppy diskette.

The Word Processor comes with a choice of printers: either an Apple Silentype draft-quality thermal printer (\$5330) or a letter-quality, daisy-wheel printer (\$7800). Software for the system includes Apple's SOS operating system, word processing application software and a training course.

Options for the two systems packages include up to 32K bytes of additional RAM memory, bringing the maximum to 128K bytes total; additional 5-1/4-inch floppy disk drives, to a maximum of four per system; either the Silentype or a letter-quality printer; the use of a standard NTSC color video monitor, an RGB (red/green/blue) color monitor or even a standard TV set; input/output cards for interfacing other peripheral devices; and a vinyl carrying case.

"The Information Analyst system should be of great value to the manager, engineer, scientist or financial real-world problem solver," Mr. Jobs said. "In addition, research indicates that once word processing systems descend below \$8000, that market will grow explosively. In the Apple III, we have a system that can process both data and words at a price below what one of those functions would cost."

Sophisticated Operating System

The purpose of the Sophisticated Operating System (SOS) used with the Apple III is to make all system operations transparent to the user. SOS ties together the hardware and software features of the computer while isolating users from details of system operation. The operating system relieves programmers and operators of many tasks by acting as a resource manager for the total computer system and by serv-

ing as a foundation for all other software development done on the Apple III.

SOS is composed of five major elements: a system manager, a file system, a device module, an event management interface and a memory manager.

The primary application interface to SOS is through the system call manager which receives and processes SOS calls from the applications running on the Apple III. The calls are decoded and the relevant information is collected and passed to the proper SOS module.

The file system is device independent, byte-oriented, interrupt-driven and controls storage elements of the computer. Every device or source of data in the system is given a file name and is placed in a hierarchy. This allows the system to perform read, write and read/write operations with all devices or data sources, no matter what type they are. In effect, SOS is an interface to all elements of the system. It makes "peeks" and "pokes" unnecessary and permits the use of Apple III as either an interrupt-driven or a polled system.

SOS's device module handles different devices according to their type: block-oriented devices such as disk memories and character-oriented devices such as keyboards. It handles blocks of data to and from block-oriented devices and one character at a time when dealing with character-oriented devices. SOS is a device-management interface, reading and writing exactly as much data as each device is capable of handling.

The event management interface associates any interrupt or polled event with data arriving from an outside source.

Memory manager makes memory use transparent to the user by permitting programs to be run anywhere in memory where there is space available, handling bank switching from

one segment of memory to another without operator intervention. This frees you from concerns about memory configuration, which can be important in larger size systems up to 128K.

Apple II emulation modes do not interface with SOS, but go directly into Apple III hardware. Once the Apple III is in the emulation mode, it is locked in. The system must be booted to go into another mode.

SOS also has a system configuration feature used to configure each user's operating system to his or her specific hardware configuration. SOS comes preconfigured to handle the most common peripheral devices so most users will only have to use the System Generation Program when they add a new peripheral.

Apple's Sophisticated Operating System overlays directly on the system hardware, providing an interface to all system elements and isolating their operating details from the user. This transparency means that no consideration has to be given to how the system hardware works in order to use all of its powerful features.

SOS acts as a foundation on which the language development modules are set so users can employ Pascal, Basic and Fortran interchangeably when appropriate. Application packages can run either on top of the language system or directly on top of SOS, thus providing the utmost in flexibility and power.

Apple III prices range from \$4340 to \$7800. At press time, systems were scheduled to be on display at Apple dealers beginning in June and customer shipments to begin in July. The Apple II and II Plus remain in the company's product line as entry level personal computers starting at \$1195. For more information see your local dealer or contact Apple Computer, Inc., 10260 Bandley Dr., Cupertino, CA 95014; (408) 996-1010. □

RACET SORTS — RACET UTILITIES — RACET computes — RACET SORTS — RACET UTILITIES — RACET computes — RACET SORTS — RACET UTILITIES — RACET computes —

MOD II UTILITY PACKAGE

Replacement Debug (DEBUG)

35 basic functions + 8 edit commands! Single step or Multiple step. Automatic trace of logic flow with printing of trace, trace of instructions greater than stack pointer values, and rapid trace. Subroutine calling. Automatic program looping. Dynamic disassembly of instructions!!!

Directory Catalog System (XDIR)

Build directory of directories!! Sorts by disk or by program. Abbreviated or full form — full form includes dates of creation and last update, and other directory data.

Wild card select options with masks. Build consolidated directory of all GL#?/BAS files. Select on filename and extension. Save or load XDIR catalog files.

Concatenate new data with loaded file.

Extended Copy (XCOPY)

Copies multiple files with a single command using masked select options! Source disk may be non-operating system disk. Single drive capability. Recover bad files — invalid sectors itemized but copy continues.

Merge files with or without replacement.

Superzap (SZAP)

Display or print and modify standard TRSDOS diskette track and sector data. Full screen edit mode. Automatic repeat scan and print. Copy disk sectors — any number of sectors to same or other drive.

Directory Fix (DFIX)

Automatic repair of HIT tables! List and flag directory errors.

Disk Identification (DISKID) Change diskette names!

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NCC Report

While the new Apple III was probably the most heralded of new products presented at the National Computer Conference in Anaheim, CA, several other products showed up that may have significant impact on the microcomputer field in the near future (For more on Apple III, see p. 65).

Among the most interesting new products are the Bubble Burst Mikro-Disc family of Winchester fixed disk drives developed by New World Computer Company. The units are intended to efficiently augment or replace floppy disks, supplement other mass storage devices by acting as high speed caches to provide fast access to data, and act as the primary file device in small systems.

According to the company, the Mikro-Disc V (5-1/4 inch system) gives the combined storage capacity of 16 mini-floppies in one compact (8" x 5.8" x 2.8"), lightweight (3 lbs.) package. The unit features a multiple head assembly that utilizes eight read/write heads. Because of the positioning of the head assembly, the entire capacity of a standard 5-1/4-inch floppy drive is under the heads at any given time and can access data in an average of 8 milliseconds. Access time from one cylinder to another (a cylinder is equivalent to the capacity of one mini-floppy) is five milliseconds.

The Mikro-Disc VIII Series (the 8-inch version) features either lubricated oxide or thin-film coated, 8-inch diameter disks and the New World Computer Company's proprietary low-mass, multiple head assembly that provides

20 read/write heads, 160 tracks per surface and places over a quarter of a million bytes (one cylinder) immediately beneath the heads, all accessible within one disk rotation. Average access time to the entire capacity of the drive is 18.8 milliseconds.

"Whether the system is ultimately intended for business, scientific, engineering, manufacturing or industrial users, the characteristics of these drives enhance their versatile use as a cache memory or swapping disk in data-base systems of all sizes; as the primary file storage device in small or dedicated systems; and as a quick-access, high-throughput storage system in on-line systems," the company said.

Company representatives added that the economical, fast-access mass storage units can fill a gap that now exists between RAM and existing file storage devices.

Both the Mikro-Disc V and Mikro-Disc VIII Series drives are available in either a "designer series" desktop enclosure or in a rack mount package. The systems are half the size of conventional floppy drives.

In support of its disk drives, the



company also manufactures a growing line of controller boards that interface the Mikro-Disc series to a variety of commercially available computers.

While the Mikro-Disc family of drives are available only on an OEM (Original Equipment Manufacturer) basis, their impact on the industry should be felt by consumers shortly as the units are provided within consumer computer systems.

New World Computer Co. Inc., 3176 Pullman St., Suite 120, Costa Mesa, CA 92626; (714) 556-9320.

Also displayed at the NCC, a product which may have profound effect on the relationship between Tandy Corporation's Radio Shack division and owners of the TRS-80 Model I, was a compatible equivalent of the Level II TRS-80.

Through an exclusive marketing agreement with a Hong Kong manufacturer, Personal Micro Computers, Inc., offers a software and hardware compatible equivalent of the Radio Shack Model I. The PMC-80, as the new computer is called, has a cassette tape recorder, 16K memory, Level II Microsoft Basic interpreter in ROM, power supply, computer and keyboard

all in one attractive cabinet. The PMC-80 will display on either a TV monitor (like the TRS-80) or on a standard TV set using a built-in VHF Channel 3 modulator. All software available for the TRS-80 will operate in the PMC-80. Level II Basic or System programs will load in the PMC-80 without volume adjustments. All peripherals designed for the Radio Shack parallel port will interface to the PMC-80 50-

based. The extensions allow you to create graphics, music and special characters with no programming. With the graphics editor, you can position points, draw lines and circles, fill in areas and choose colors. Your completed graphic can be named and referred to by that name in your Pilot program.

Sound is another extension. Music can be composed or transcribed by

External memory development – TRS-80 twin – Apple software –

pin bus through a 40-pin interface adapter available from Personal Micro Computers, Inc.

Disk based programs can be run on the PMC-80 using the Radio Shack Expansion Interface or other commercially available equivalents. With the Expansion Interface, all peripherals designed for the TRS-80 are also compatible with the PMC-80. These include Winchester disks, speech recognition units, printers, RS-232 adapters and so forth.

Personal Micro Computers will initially market the PMC-80 by mail order only in both the USA and Canada.

The introductory price of the PMC-80 is about \$200 less than a comparably equipped TRS-80. To facilitate mail order marketing, the firm offers a 30-day, no questions asked, money-back guarantee. Service on the equipment will be performed by Personal Micro Computer, Inc., at its Mountain View, CA factory.

Owners of TRS-80s could be overheard at the NCC making comments to the effect that they would no longer be at the mercy of Radio Shack which is often perceived as being less responsive to the needs of TRS-80 owners than is desirable to those owners.

Personal Micro Computers, Inc., 475 Ellis St., Mt. View, CA 94043; (415) 968-1604.

On the software front, Apple continues to expand its horizons with the addition of Pilot and Fortran high level languages.

Pilot was designed for creating Computer Assisted Instruction (CAI) and is said to be the most widespread CAI language available today.

Apple Pilot offers three extensions to common Pilot, upon which it was

specifying note selection, order, duration and special effects.

A character set editor, the third major extension, allows you to draw and save special characters for specific programs.

Apple Pilot requirements are an Apple II or Apple II Plus with 48K memory, one disk drive for Lesson Mode or two disk drives for both Author and Lesson modes, a video monitor or television, and DOS 3.3 or the Apple Language System.

Apple's other high level language offering at NCC, Fortran, will allow many scientists and engineers who presently use Fortran on large systems in their daily work to use those same programs on the Apple.

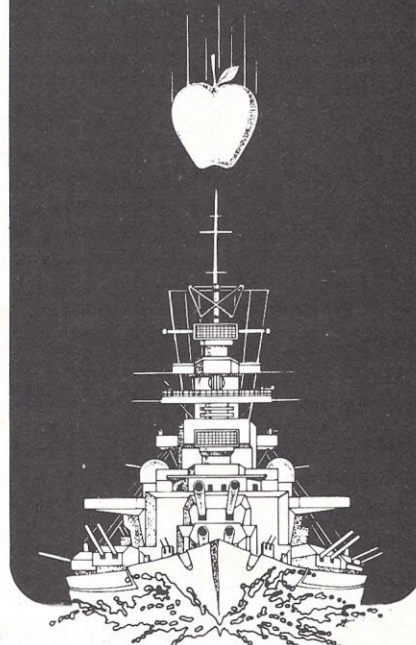
According to the Apple Computer Corp., Apple Fortran contains additions to Fortran IV and provides structured programming concepts that are added to traditional Fortran statements in the form of expanded "If" statement constructs.

Because Apple Fortran operates in the Apple Pascal Language System, the same software development environment provided to Pascal users is also available to Fortran programmers. Under the Apple Language system, Fortran, Pascal and assembler routines can be created into a single program. In addition, Fortran takes advantage of Apple's high resolution graphics capabilities, sound and control paddles.

Minimum system configuration for Fortran use is an Apple II or Apple II Plus with 48K and the Apple Language System. One disk is necessary; two are recommended.

Apple Computer Inc., 10260 Bandley Dr., Cupertino, CA 95014; (408) 996-1010. □

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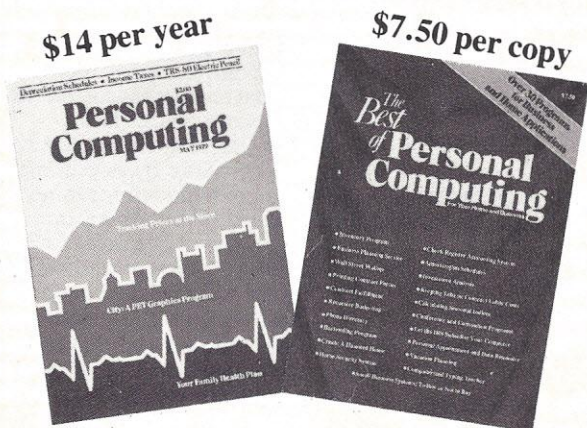


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HARRY SHERSHOW — Dept. Editor
MORRIS MILLER — Chess Annotator

Computers in the Life of Chess

BY HARRY SHERSHOW

Having been associated with computers for a number of years, and with dedicated chess-playing computers more recently, I now feel compelled to come to the aid of the computer. It might be better to let the computer talk for itself because that is one of the things it does quite easily. (Calculating the weight of the universe on a cloudy day is a more difficult problem for the computer and takes a little longer in time.) However, because computers speak so fast (at the speed of light) and humans listen so slowly (at the average typewriting speed of 80 words per minute) the machine needs a little help when expressing its thoughts to the world of flesh and blood devices.

First of all, it is apparent that letter writers in chess publications who are banging angrily on the metal shells of computers have lost sight of the chivalrous significance of chess: to defend the proletariat and attack the wooden oligarchs. The ancient motivation in chess (trying to capture the enemy king) has been lost. Instead, players try to knock their opponents off their chairs and kick them out of the chess clubs.

A dedicated chess player always has had one purpose through the many passing centuries in the history of the game: to trap the opposing king no matter whose hand had rocked the royal cradle. It was of no concern to him who that opponent was. The contest was on the board and the battle plan was to get the other guy's king. The game has now lost its meaning and the struggle seems to be against the opponent rather than with the chess pieces. If that is true then the human player should challenge the computer to a duel, not to a chess game.

"The computer cheats" is the main complaint. The machine is said to have the advantage of storing more chess-game examples in its data base than does the human. But what the human neglects to say is that the data stored by the computer are simply games that humans have played. Therefore, one

must conclude that the computer should not be able to play better than a human because all its knowledge is human knowledge. There is no such thing as computer chess or computer knowledge.

If on the 40th move of a chess contest, for example, the best move that your opponent might make is Qe4, does it matter *who* makes that move? If the move were made by magnets held beneath the board, would it make a difference in the play? Why should we argue that at any given point in a chess game a computer should be programmed to make a weak move so that the human could win? Do we ask grandmasters to lower their level of play so that they can be beaten by novices? Are you being cheated if you lost to a computer? Would it still be cheating if you lost the same game to a grandmaster?

Some sound advice to chess players is to concentrate on your game and ignore your opponent. An old time radio comedian's favorite joke was about a chess player who boasted about his dog that could play chess. "A dog?" echoed the listener. "That's amazing! Imagine a dog that plays chess!" "What's so amazing about that?" asked the comedian. "I beat him all the time."

Let's not bar computers from tournament chess! Better to bar grandmasters.

If you're playing a computer and it is beating you, you can always lean over and switch down its search tree by one level, thus dropping it from an 1800 rating to a 1600 rating at which point you might beat it. That's fair! You can't do that with a grandmaster. And that's unfair!

The following related letter appeared in the July, 1980 issue of CHESS LIFE:

Ban Non-Humans? The Nerve!

In response to Mr. Johns' letter in the March *Chess Life*, I am furious at his unethical attempt to exclude from tournament play those of us he calls "non-human."

Although on our planet we have decided that chess is a social activity and not for computers, we have admitted aliens as long as they can show evidence of membership in their planetary chess association and can keep score using descriptive notation. I hope Mr. Johns is willing to join us in this position.

On my next vacation I was planning to visit Earth and play in one of your tournaments. I hope to be welcomed despite the fact that I breathe by inhaling nitrogen and exhaling smoke. Maybe I can hold my breath while my opponent thinks.

Reyalpssehc Doogmad
Andromeda Nebula

World Tournament

The 3rd World Computer Chess Championship at the Brucknerhaus in Linz, Austria, Septemebr 25-29, will be one of the many special events during the annual Bruckner Festival. The tournament will be a four or five round Swiss-style tournament with participants restricted to computer chess programs. All of the best chess programs in the world, some running on microcomputers, are expected to participate, and an

exciting tournament is anticipated. The current World and North American Champion, CHESS 4.9 of Northwestern University, will return to defend its title. Also expected to participate are the former World Champion, KAISSA, from the Moscow Institute of System Studies; MASTER, the current European champion; BELLE, CHAOS, DUCHESS, and other programs from Europe, the U.S., and Canada.

BLOSS Flunks Test

"I recently purchased a SARGON 2.5 Chess Computer," writes Floyd R. Kirk of 716 N. 80th St., Seattle, WA., "with its seven levels of play. Using these different levels, I can show, in the various tables in this article, that the BLOSS Rating System, as explained in your magazine, can't be applied directly to *all* chess computers.

"The mating capability description applies only if there is a legal way to do so and does not involve underpromotion. Level 4 earned the rating of 1640 in a computer chess tournament; the other ratings seem to be reasonable estimates.

"I played the BLOSS chess problems (*Personal Computing*, Sept. 1979, p. 62) on the various levels of the computer, after Gary Ratliff had kindly corrected several typos. The necessary corrections were:

Problem #30 3q3r/2pb1Qp1/1rpk1b2/3pN3/
3Pp3/2N4P/PPP5/R3K2R//
#65 4R3/1rq2ppk/6p1/1r6/8/4Q3/
1BP4P/1K6//
#70 White mates in four
#85 R6R/1r3pp1/4p1kp/4P3/
1r2qPP1/8/3Q3K/8//

"The other problems were okay as published. Table 1 shows the results of the problems for each level, listing the move chosen and the number of seconds taken. A 600 means the wrong move was selected, and a 600+ means that the right move was selected but required more than ten minutes to do so.

"I then used the formulae developed by BLOSS (*Personal Computing*, Dec. 1979, p. 73) to calculate the ratings. However, instead of rounding to the nearest ten seconds, I simply used the times shown in Table 1. (For Problem #62, Level 2, I used the average of the two times, because each answer was selected about half the time). Table 2 shows the results.

"A comparison of the tables shows that BLOSS's formulae are of limited use in rating different levels of one

Level-ratings Table

Level	Average Time	Mating Capability	Approximate USCF Rating
0	1 Sec	Find any mate in 1	—
1	10-15 Sec.	Avoid any mate in 1	1000
2	20-40 Sec.	Avoid any mate in 1	1200
3	45-90 Sec.	Find any mate in 2	1400
4	2-4 Min.	Avoid any mate in 2	1640
5	20-40 Min.	Find any mate in 3	1800
6	2-4 Hr.	Avoid any mate in 3	—

Table 1

	Level						
Problem	0	1	2	3	4	5	6
#20	d5-c5 600	d5-a8 9	d5-a8 22	d5-a8 22	d5-a8 61	d5-a8 47	d5-a8 44
#25	g1-f2 600	g1-f2 600	g1-f2 600	f4-a4 66	f4-a4 275	f4-a4 246	f4-a4 222
#30	f7-d7 600	f7-d7 600	f7-d7 600	c3-e4 74	c3-e4 146	c3-e4 93	c3-e4 94
#35	d5-f6 600	d5-b6 600	d5-b6 600	b7-c7 29	b7-c7 55	b7-c7 48	b7-c7 48
#40	a4-e4 1	a4-e4 8	a4-e4 20	a4-e4 28	a4-e4 75	a4-e4 56	a4-e4 57
#45	h4-e1 600	h4-e1 600	h4-e7 23	h4-e7 25	h4-e7 62	h4-e7 45	h4-e7 45
#50	g2-e3 600	g2-h4 11	g2-h4 23	g2-h4 46	g2-h4 122	g2-h4 92	g2-h4 93
#55	b7-a7 600	b7-b6 13	b7-b6 31	b7-b6 46	b7-b6 93	b7-b6 67	b7-b6 67
#62	e5-d5 600	e5-d5 600	e5-d5 600 f6-e6 46	f6-e6 89	f6-e6 178	f6-e6 548	f6-e6 600+
#65	e3-h3 600	e3-h3 600	e3-h3 600	e3-h3 600	e3-h3 600	e8-h8 266	e8-h8 600+
#70	d3-e4 600	f6-g7 600	f6-g7 600	f6-g7 600	f6-g7 600	g1-g8 600+	g1-g8 600+
#75	d7-f6 c8-a8 600	d7-f6 c8-a8 600	d7-f6 c6-e8 40	d7-f6 c6-e8 58	d7-f6 c6-e8 131	d7-f6 c6-e8 286	d7-f6 c6-e8 600+
#80	e4-g5 600	e4-g5 600	e4-g5 600	e4-g5 600	e4-g5 600	g4-g6 600+	g4-g6 600+
#85	h2-g3 600	h2-g3 600	h2-g3 600	h2-g3 600	h2-g3 600	f4-f5 600+	f4-f5 600+
# Right	1	4	6-1/2	10	10	14	14

computer. The fault seems to be two-fold. First, too high a rating is given for an incorrect answer and too low a rating for correct answers which take over ten minutes.

Second, an even larger error is due to the depth-first algorithm used by the computer, meaning that the problem is generally most rapidly solved by the level that just guarantees the solution. Thus level 3, designed to solve a mate-in-two, has the best performance on that type of problem, just as level 5 has the best performance on mate-in-three problems. A higher-rated person might be expected to solve the problems quicker; a higher-rated level just has to evaluate more positions before discovering the mating sequence."

Table 2

	Level						
Problem	0	1	2	3	4	5	6
#20	1306	1883	1742	1742	1594	1630	1640
#25	1302	1302	1302	1635	1411	1427	1443
#30	1338	1338	1338	1662	1549	1623	1621
#35	1313	1313	1313	1911	1765	1795	1795
#40	2511	2047	1870	1810	1643	1690	1688
#45	1379	1379	1854	1840	1695	1745	1745
#50	1359	2110	1946	1803	1619	1670	1668
#55	1409	1981	1833	1770	1663	1712	1712
#62	1214	1214	1341	1651	1476	1232	1214
#65	1336	1336	1336	1336	1336	1422	1336
#70	1325	1325	1325	1325	1325	1325	1325
#75	1411	1411	1716	1670	1575	1488	1411
#80	1458	1458	1458	1458	1458	1458	1458
#85	1492	1492	1492	1492	1492	1492	1492
Average	1440	1542	1562	1650	1543	1551	1539

Come to the Fair!

If you have a non-commercial chess program that runs on a microcomputer, or if you have a commercial product (in cassette, disk or stand-alone device), you are invited to participate in our tournament. *Personal Computing's* "First Annual North American Microcomputer Chess Tournament" is being held at Le Baron Hotel, San Jose, CA on Fri., Sat., Sun., Sept. 5, 6, 7. Sponsoring the tournament, besides *Personal Computing*, are Motorola, Applied Concepts Inc., and the Mychess Programming Team. Suitable prizes and awards are being prepared. Famous Masters, Grandmaster and giant chess-playing computers will be on hand to accept audience challenges. There will be exhibitions, demonstrations and spectator participations. Chess is becoming a best-selling electronic-type "game" and some companies, we hear, will be on hand to evaluate some of the non-commercial programs with a view to producing them commercially. If you're interested in learning how to write your own computer chess program, you will be able to talk to and listen to some of the participants. Ex USCF-president, George Koltanowski, is organizing and coordinating the tournament. John Urwin, of Mychess, is assisting him. Bryce Perry, a VP of USCF, is director.

To participate as a chess-playing competitor
in the tournament, fill out and mail entry form.

To: George Koltanowski

1200 Gough Street, Apt. 4D, San Francisco, CA 94109

Entry Form

Name of player _____
Street address _____
City, State, Zip _____
Telephone number _____

Non-Commercial Entrant

Name of program _____ Language used _____
If run on off-shelf microcomputer, name of machine _____
Memory size and speed of machine _____
If run on home-made device, describe same (indicate type of μ P used) _____

Commercial Entrant

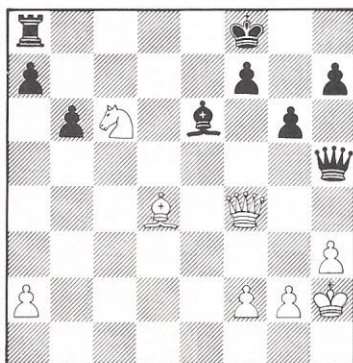
Name of commercial product or commercial program _____
Indicate media form ("stand alone," cassette, disk, etc.) _____
Average retail price _____
If not "stand alone" what computer does it run on _____
Who wrote program (fill in if known) _____
What version of program is this or when was last upgrading (fill in if known) _____
What is approximate rating of program _____

Electronic Chess: Changing Aesthetics and Mores

BY WALTER KORN

When analyzing chess programs one must load them with human problems not machine problems. How does a computer respond to a classic problem? Its performance is a good measure of its capabilities. The following examples illustrate this idea. The two positions shown are classic combinational developments and both permit forced wins. They are illustrations of many such similar examples and lend themselves to some pointed, open-end observations.

Diagram A
(Sveshnikov vs. Ivanov)



White to move and win

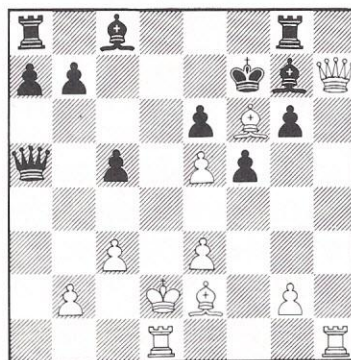
The setting shown in Diagram A arose in a game between two International masters, E. Sveshnikov and I. Ivanov, at Minsk (USSR) in 1976. I saw its brilliant finale reproduced in many magazines and columns. The full score appeared in a 1977 issue of the authoritative *Chess Informant* (Belgrade). In all cases the solution was given, without comment: 1 Qf4-d6+ Kf8-g8; 2 Nc6-e7+ Kg8-f8 3 Ne7xg6+ Kf8-g8 4 Qd6-f8+ RxQ 5 Ng6-e7 and a beautiful "smothered mate." The earliest version of such a move sequence was first documented in Lucena's *Arte de Axedres* in 1497. As chess strategies revolved around set conventions, this particular mating pattern often reappeared, always catching

the chess world's fancy. In the 18th century this familiar matrix was christened "Philidor's Legacy." Later, other patterns evolved, with their own practical modifications. They acquired such descriptive names as the "choke;" the "corridor;" the "epaulette;" the "gueridon;" "Blackburn's, Damianos', Greco's, Morphy's, Reti's or Anastasia's mate;" the "two Bishops" mate, the "straightjacket;" and the "vertical/diagonal" mate (mostly with rook and bishop) — making it a baker's dozen of recurring brilliancies. By now, some of them may possibly have found their way into a chess program (the difficulty lies in conceptualization.)

There is, however, an oversight in the only given solution that is outlined above. Notice that there is a rapid, cold mate in two: 1 Qf4-f6! (Black's queen sacrifice can delay the mate by one more move.) This instant win was never given in any commentaries I have ever seen!

In the second position (Diagram B) White's win apparently originated during a simultaneous exhibition in the USSR in 1979 by grandmaster Kapengut, losing as Black against Mujassin (White). Again, the true artist's forced, shining, sequence would be, I thought: 1 Qh7xg6+!! If Black tries to sidetrack into 1...Kf7-f8, then 2 Be2-h5

Diagram B
(Kapengut vs. Mujassin)



White to move and win

forces mate by either 3 Qg6-f7 or 3 Qg6-e8. Thus, Black plays 1... Kf7xg6 2 Be2-h5+ Kg6-h7 3 Bh5-f7+ Bg7-h6 4 Rh1xh6+ Kh7xh6 5 Rd1-h1#. A double-diagonal/vertical mate!

After a visit to the 1980 Computer Faire Micro-Chess Tournament in San Francisco, I arranged to feed the above two "typical" positions into three of the programs: Mychess 2; Sargon 2.5 and Atari. The responses from all three were, remarkably, almost uniform.

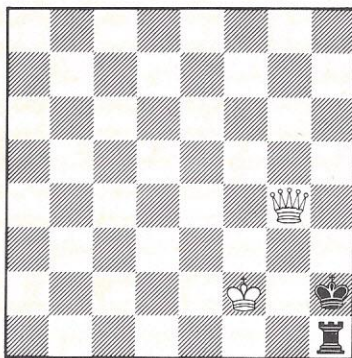
Summarizing the main computing responses for Diagram B, the usual starting move by the machine was 1 Rh1-h6 with the continuation: 1...Kf7-f8 2 Rh6xg6 Qa5-c7 3 Bf6xg7+ Qc7xg7 (to delay the end) 4 Rg6xg7 Rg8xg7 5 Qh7-h8+ Kf8-f7 6 Be2-h5+ Rg7-g6 7 Bh5xg6+ Kf7xg6 8 Qh8-h7+ Kg6-h6 and 9 Rd1-h1#. At no level did any of the tested micro-models "conceptualize" 1 Qh7xg6 on its own volition. When directed to answer it, the "solid" move invariably was ...Kf7-f8. (On Level 2, with a tree search of only three plies, the microcomputer would not be able to see the 9-move sequence beginning with 1. Qh7xg6 Kf7xg6.)

In Position "A," the machine discarded 1 g2-g4 (attack on the queen); or 1 a2-a3 (protecting the threatened pawn); or 1 Qd6+, apparently seeing the quicker progress with 1 Qf4-f6, (anticipating mate in two.) I then prodded the machine by feeding it the 1 Qf4-d6+, with its responses 1... Kf8-g8 2 Nc6-e7+ Kg8-f8. After this event the machine failed to make the grandmasterly reply 3 Ne7xg6+, as taken for granted by all commentators including myself. Instead, it came up with the prompt killer 3 Ne7-c8! and simple mate next move!

Some questions come to mind. What is mind (or) beauty over matter? What is "creativity" when exposed as merely extending custom or turning it over on its head? Is the ingenuity of the computer, pushing back its frontiers by re-

lentless accuracy and exposing man's fallacies? Will the computer, with advanced programming, master the art of the combinational finale? Will it offer us alternatives for making our decisions? Will we begin to believe in its infallibility or will we maintain a balance by using the micro-processor as a tool for cross-checking our own actions? Here again, it struck me to test a specimen I had seen in a chess journal. It was an analysis by the Belle program of an endgame that had reached Position (C).

Diagram C
(For whom the 'Belle' tolls)



Black to move

The editor had stated: 30...R any, 31 Q mate. While the mate was truly imminent, the statement was not precise. I fed the position into the computer which came up not with 30...R any, but with 30...Rh1-f1+ 31 Kf2xf1 Kh2-h1 and only now 32 (not 31) Q mate! Manual reporting — and transmission and copy — was prone to err versus relentless, calculating, machine transcription if carried through to the end. Yet, still another problem arose: Had Belle simply announced "mate" and was cut off before its move? Otherwise, where was the queen going for the mate? Without pin-pointing my respective models, Microprocessor "A" mated by 32Qg4-h5 and Micro "B" played 32Qg4-g2! But we also have 32Qh4#, or Qh3#, or Qg1#.

One may wonder which physical, mental, optical, or other impulse causes the human player to select a specific mate among various ones available. Is it his feeling for given distance; or his vision of a certain symmetry (I would go for h3); or of brutally massing all force on h1; or tantalizingly on g2? What are the criteria in terms of

aesthetics or functions? I won't delve into the two programs' electronic impulses. They are linearly programmed in different ways, with their own logic. They stop at the terminus of the first five-pronged fork. But the human player's motives remain unanswered.

Having looked innocuously at *traditional* facets of chess, I realize that after a millenium, the dawn of a new electronic micro-millenium confronts us with novel criteria and attitudes. The computer's independence from the individual's moods, from climate, diets and sleeping habits, permit mechanical perfection even in the face of some "beautiful" concepts missing in the program.

The average chess player is not about to give up his hobby because the best computer chess player *might* someday beat the best human chess player. Neither the amateur nor his peers ever expected to become champions themselves. But their field of application has widened and mechanical interests have been added which will help break the game's introverted isolation of a merely mentally-oriented "two-man" game.

The player of tomorrow will use the computer as an educational, instructional, information-storing and retrieving device. He will have a new potential for re-checking and control, and of communication and interaction. Someday the computer will play in chess tournaments as regular "programs," not as experimental tools only.

At the moment, casual skittles by the computer on level one produce too many glaring blunders after a few moves and before the small "memory" could be activated. But the independent program was not perfect either. The potentials are being synchronizied, the bytes are being increased, and "concepts," like underpromotion, are being tentatively built into current computer models. As man tends to take a computer's dictum for granted, it becomes imperative that a teaching curriculum be reliable on all levels.

With all these new factors around us, computer technology will also alter the shapes and aims of chess organization — some of which are already obsolete. To illustrate just a few categories out of many touched upon in chapter 14 of my book *America's Chess Heritage* (David McKay, New York, 1979): "The only

remaining requirement for manpower is transcription of copy not yet geared to machine pick-up." Since T.B. Wilson's invention and use of the manual chess clock in 1883, over-the-board play, time control, recording, reproduction, and transmission of games have been separate, manual operations.

Now we have models of chess devices designed to spontaneously record (and respond to) moves received on their magnetized boards. Electronic speculations of today will become practical facts tomorrow. They will affect all playing practices as well as the function of organizers and participants. They will reshape the economics of chess, its promotion, its publicity, the types of chess equipment as well as related audio-visual materials. All this I have already forecast in *Chess Review*, 1965-8.

The increase in "electronic links" also provides freedom from physical presence and social interaction, allowing the audio-video operators to form their own individual and team contacts. The home-chess-entertainment industry will quickly enter video, home-computer, and cable TV systems. Video cassettes will answer personal needs and commands and will emerge into bodies of mass participation. This generation's technical aptitudes will favor the promotion of the game throughout the hobby spheres.

Likewise, Home Base or CB (Civilian Band) Radio may begin to play a role in a "mobile" dynamic sense, at the desk, in the car or on the picnic ground. They will provide a market place supported by the business and home communities. A variety of new recreational and competitive games will emerge to everyone's financial benefit and delight. Two platforms will, for a time, function alongside each other. The soon-to-be historical platform of customary chess will carry on business as usual. On the other hand, computer software will establish new mores, new norms, new techniques and new regulations. From the mists of history, from Asia through the Middle Ages and into the Electronics Era, a vision of the future is emerging. And it is getting clearer.

(Walter Korn is best known for his work on "Modern Chess Openings" (he has been editor of MCO for 30

years). For many years he was a contributing editor to *Chess Review* and has written for other leading magazines. He has also covered the entire topic of chess in the latest edition of Encyclo-

paedia Britannica. Mr. Korn is a FIDE International Judge for Chess Compositions and the author of "The Brilliant Touch in Chess" and "American Chess Art." The latest edition of his series on

chess openings (MCO-12) is scheduled for publication in late Fall 1980. For a description of his most recent book on chess, see ad in Classified Section, this department.)

Check and Double Check

The following letter from F. Gerlach, 8800 Fondren #327, Houston, TX 77074 offers a very interesting counter-analysis to Morris Miller's comments (PC, Jan. 1980.) "What book is Morris Miller referring to," writes Gerlach, "in his annotation of the Mychess vs. Xenarbor game? My books — *MCO/11, Encyclopedia of Chess Openings (ECO), Guide to the Chess Openings*, etc. — indicate a 6 N (4) -N5 main line with ECO showing 6 N-N?! Morris Miller may prefer 6 N-KB3 B-N5 7 B-QB4 0-0 8 0-0 BxN, but ECO gives 8...P-Q3!

In note (b) 9 B-QB4 is the ECO choice so that if 9...RxP (as played by Alekhine) 10 B-N3 traps the rook.

In the Ray Ratke letter in 11/79 *Per-*

sonal Computing, after d1-c1 in the Bulgarian Problem, there is no mate in one after Black plays c4-e3.

Morris' response:

"I refer to no book except my own inclinations gleaned from a lot of chess playing. The standard books on openings are a must, I think, for correspondence play, and for masters. But I must stress that they are far from the last word; fashions in chess openings, as in everything else, are changeable. Some masters even keep secret their last researches to spring them on their unwary opponents; it is then that these latest wrinkles find their way into the books on the openings. And even books on openings can be mistaken. (There is a

famous example, I can't recall where, that a book gives black as having the better game when white has a mate on the move!).

"Taking Mr. Gerlach's line: 6-N-KB3, B-N5; 7-B-QB4, 0-0; 8-0-0, P-Q3, as I see it black has a backward pawn on the open queen's file. White's best move now is 9-Q-Q3. Black's king bishop, because of its position on N5 and because of the black pawns on black squares, thus limiting its range, is sooner or later committed to exchange by 9...BxN; 10-PxB. Now the white queen bishop has a fine square at R3 to attack the queen pawn, plus R-Q. Should black try B-K3, white of course should not exchange but play B-N3 or even B-KN5.

Miller on Mychess vs XENARBOR

(The game documentation of MYCHESS vs. XENARBOR is reproduced here together with Morris Miller's first two comments of his annotations.)

MYCHESS White

1. P-K4
2. N-KB3
3. P-Q4
4. NxP
5. QN-B3
6. NxN (a)
7. QB-N5
8. BxN?
9. N-R4 (b)
10. B-Q3
11. 0-0
12. P-KB3
13. K-B2
14. P-B3
15. P-QN4

XENARBOR 4 Black

- P-QB4
- N-QB3
- PxP
- N-B3
- P-K4
- NPxN
- R-QN1!
- QxB
- B-K2
- 0-0
- Q-N3
- P-Q3
- B-K3
- Q-R4
- Q-R5ch

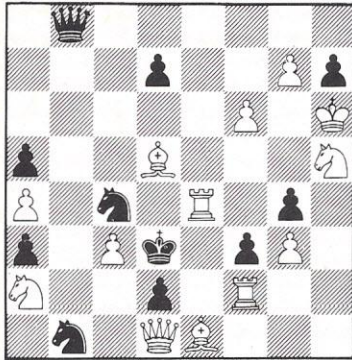
16. K-K2
17. K-B2
18. K-K3
19. K-K2
20. B-R6
21. K-Q3
22. B-B4
23. R-KN1
24. R-QN1
25. P-R3
26. Q-KB1
27. KxB
28. K-K3
29. Q-N2
30. B-N3
31. Q-K4
32. QxBP
33. QxP
34. K-K4
35. R(KN)—Q1
36. Q-K7
37. B-B7
38. QxB
39. KxBP
40. R-Q7
41. QxP mate

- QxRP
- B-R5ch
- Q-B5ch
- Q-R7
- QxPch
- B-B1
- B-R6
- Q-KB7
- B-N7
- BxP
- BxPch
- Q-QB7ch
- QxN
- P-N4
- QxRP
- K-R1
- R(N1)—B1
- P-B3
- B-B7
- B-N3
- P-QR4
- RxB
- P-B4ch
- B-K6
- QxP

a) Book, but I prefer 6-N-KB3, B-N5; 7-B-QB4, 0-0 [not 7...NxP; 8-BxPch, K-B; 9-0-0!, NxN; 10-PxN, BxP; 11-B-R3ch, KxB; 12-Q-Q5ch, K-K1; 13-KR-K1! with a mating attack; or 12...K-B3 or N3; 13-QR-N1 followed by R-N3 and the rook goes over to the king side] 8-0-0!, BxN; 9-PxB, NxP; 10-R-K1, NxQBP; 11-Q-Q3, N-R5; 12-B-R3, R-K1; 13-B-Q6. White will get back one of his two pawns and have the two bishops and a crushing advantage. The point of the above variations, which are of course far beyond the lookahead of the programs, is that the input of mere opening moves is not enough. The principles behind the moves have to be instilled or disaster follows.

b) Best is 9-R-QN1. Mychess is afraid of the pin and indeed seems to value knights over bishops, as evident by its previous move, a concept that is bad and should be eliminated. Black now has the move R-N5, winning a pawn at K4 or N7.

The Bulgarian Problem



White to play and win

"I am not saying white has a won game; this is the sort of situation where I would rather have the white pieces than the black.

"With regard to Mr. Gerlach's suggestion 8-B-QB4, it is not that clear-cut: 8-... RxP?!!; 9-B-N3, B-N5; 10-Q-Q3, Q-R4; 11-B-Q2, B-R3; 12-Q-K3, P-Q4; 13-PxP, 0-0; 14-0-0-0, Q-R6 etc. Of course, if in this line 10-B-Q2, Q-R4; 11-N-K2, NxP; 12-BxB, Q-K1 (or KB1), RxBP; 16-BxR, QxB. Black has three pawns and a bishop for the exchange and a fearsome array of center pawns. If now 17-N-N3, B-Q6; 18-R-QB1, Q-R5

holding on to everything.

"I have gone rather more deeply into this opening line than I originally intended but the point is no book is the last word on the subject; I am sure there is much more on the line that can be said.

"Regarding the Bulgarian problem Gerlach states after d1-c1, should black respond c4-e3 there is no mate. However, there is e4-d4 mate. These block position problems are somewhat difficult and it is easy to understand how your correspondent could have overlooked this." — M.M.

Boris on the Move

Current producer of the Boris 2.5 chess playing device (the program that holds the title of world's microcomputer chess champion) is now Applied Concepts of Texas. That company recently issued the following announcement concerning its activities:

"Applied Concepts, a leading manufacturer of electronic games for the past three years, has announced a major expansion of its corporate structure. ACI is developer and manufacturer of BORIS, BORIS MASTER, BORIS DIPLOMAT and the Modular Game System with its Chess Module, Las Vegas 21 Module, Checker Module and others being developed. With so many new products on the drawing board and our production staff at full capacity, a coordinated approach to our marketing seemed the next logical corporate advance."

In June, the company revealed some additional exciting new products at the Consumer Electronics Show in Chicago.

Established in March of 1977, A.C.I. entered the highly technical field of manufacturing "smart" computer chess games. "The state-of-the-art technological expertise, plus our highly skilled marketing organization, were the ingredients contributing to A.C.I.'s achieving and maintaining a leadership role in the highly competitive computer chess game race," said Alan B. Mead, President. Mead has 11 years of engineering and management

experience and holds several design patents in the electronics industry. Executive Vice President, Stan Partee, whose primary duties are materials management, administration, legal and financial matters, has 7 years of experience in these areas. Vice President of Operations, Jim Morgan, has 12 years of manufacturing and operations management experience. Export Manager, William Harris, has 14 years experi-

ence in sales and marketing in various industries. Production Manager, Ed Schuett, has 17 years experience in the development and management of the electronic assembly facilities which includes expertise across a broad range of products and services provided by this industry. For further information, contact Jim Morgan, Applied Concepts, Inc., 207 North Kirby St., Garland, TX 75042 (214) 494-0281.

Postscripts...

One rule on the ICCA list which may someday lead to heated controversy is the stipulation that "a program listing or other detailed description of the computer (possibly verbal) should be available on demand!" In effect, any participant at any ICCA-sanctioned tournament can demand to see any program being used at the tournament. Writer of a weak-playing program might want to get a close-up look at Chess 4.9 and possibly use the listing to upgrade his own program. Would David Slate be willing to let any competitor have a look at his book? Will KAISSE make available its program at the upcoming ICCA sponsored World Tournament? Among micros, would CHESSE CHALLENGER have a chance to study the routines of BORIS? Fortunately for the tranquility of tournaments, no one

has yet challenged that rule and demanded a look at someone else's program. Or is there a gentleman's agreement not to challenge this rule?

While *Personal Computing* and its co-sponsors are conducting the first official North American Microchess tournament in San Jose, Sept. 5-7, David Levy is organizing a similar tournament in London scheduled to run at the same time. It's unfortunate that time-sharing for microcomputers is not yet feasible. Otherwise, we could have an ongoing two-continent tournament. If two different entries of the same program won both tournaments, would we then have, for the first time, a true world microcomputer chess champion? Perhaps we could then have a playoff with Boris 2.5 representing the United States and Boris 2.5 representing the United Kingdom. (Muhammed Ali would call that shadow boxing.)

Classifieds

Rates for advertising in this section: \$1 per word. Minimum. 15 words. Allow two months for appearance (usual publication lag). Announcement of human tournaments that are open to computers published without charge. Send all submissions for this section to **COMPUTER CHESS CLASSIFIED DEPARTMENT**.

JOIN:

ICCA (International Computer Chess Association.) \$10 annual membership includes the **ICCA NEWSLETTER** with computer-chess news from all over the world. (Back issues, \$2 for set of three.) Send U.S. check or international money order to ICCA, c/o Ken Thompson, Room 2C423, Bell Telephone Labs, Murray Hill, NJ 07974, USA. Editorial material for the ICCA Newsletter should be sent to: B. Mittman, Editor, **ICCA NEWSLETTER**, Vogelback Computing Center, Northwestern University, Evanston, IL 60201, USA.

MYCHESS:

MyChess which placed sixth at Tenth A.C.M. with 2 1/2 points (one full point over Sargon 3) is now available for CDOS, CPM and TRS-80 operating systems. The overall rating for MyChess for the A.C.M. tournament was 1544 (USCF) and this improved version now available will play an even better game than it did at A.C.M. For the program on a small or large disk send \$50.00 to Dave Kittinger, 2431 Lyvona Lane, Anchorage, Alaska, 99502.

NY AUGUST OPEN CHESS TOURNAMENT

A 4-round Swiss System tournament August 2-3 at Bar Point House of Backgammon, 69 W. 14 St., New York. Time limit 30/90. In 2 sections: **OPEN SECTION**, open to all humans or computers. Entry fee \$24.50 if mailed by 7/28, \$30 if paid at tournament. Prizes: 4-0 wins \$200, 3½-½ \$100, 3-1 \$40, 2½-1½ \$20. **BOOSTER SECTION**, open to humans or computers rated under 1800 or unrated. Entry fee \$17.50 if mailed by 7/28, \$20 if paid at tournament. Prizes: 4-0 wins \$100, 3½-½ \$50, 3-1 \$20, 2½-1½ \$10. **BOTH SECTIONS:** USCF membership required (may be paid with entry fee). Entries close 9:30 AM. Rounds begin 10 AM & 3:30 PM each day. ½ point "bye" available if you can't play round 1. No smoking. Send entries to Continental Chess Association, 450 E. Prospect Ave., Mt. Vernon, NY 10553.

TO ALL CHESS PROGRAMS

If you are an original microcomputer chess-program and would like to slug it out with other programs for the title of champion of North America join our tournament in San Jose. On Sept. 5, 6 and 7 a new king will be crowned (or possibly an old one re-crowned!) For more information write to tournament organizer, George Koltanowski, 1200 Gough St., Apt. D-3, San Francisco, CA 94109.

THE JOY OF CHECKERS

Explore, enjoy checkers! Send for rules, pointers, sample magazine, membership benefits. Our bet: \$5,000 on World Champion Tinsely against any computer! American Checker Federation, 3475 Belmont Ave., Baton Rouge, LA 70808.

NEW! SARGON/BORIS 2.5

Chafitz modular games system featuring the world's strongest playing microcomputer chess program! (Plays above 1500 level in tournament time.) We have **SARGON 2.5** plus the Response Board in stock and available for immediate delivery! Write or phone, 24 hours a day for free discount price list, brochure, and an in-depth technical report. Palmer, McBride and Kincaid Associates, PO Box 598, East Brunswick, NJ 08816. Tel. (201) 246-7680.

ENTER A GOMOKU TOURNAMENT

Do you have a GOMOKU program? Would you like to write one? Those with own programs can enter an International GOMOKU Tournament and, if # 1, can take on the European champ. (The following individuals are looking for people to play GOMOKU with: Robert Brandenburg, 9515 Clubhouse Lane, Tampa, FL, 33615; Ed Slodysko, Jr., 1118 Valley Drive, NW, N. Canton, OH 44720.) For more information on the GOMOKU Tournament itself, write to Dr. Shein Wang, Institute of Computer Science, U. of Guelph, Guelph, Ontario, N1E 1C8.

TAPE 'N TEXT:

Learn how to program your own computer games! Introducing our best selling **BASIC Programming Course** — used in over 700 schools and businesses. You can acquire proficient use of the language. Order your personal copy today! **BASIC Programming Course** consists of 12 audio cassette tapes with 12 printed texts. The tapes are narrated by William R. Parks. It sells for \$59. Tape 'n Text, Williamsville Publishing Company, PO Box 250, Fredonia, New York 14063.

CHESS TREASURES

"America's Chess Heritage — from Benjamin Franklin to Bobby Fischer and Beyond" by Walter Korn, editor of MCO. A factual book that looks at both the private and public lives of chess greats. Discusses computer chess, development of competitions, success of international chess Olympics, trends in playing styles, etc. Examines the future of chess in America. Written by a "recreation-oriented chess-loving generalist," this book appeals to the enthusiast of any strength who is interested in the background and future of chess and its players. Fully annotated games and diagrams accompany the lively text. Includes a special index of games for quick reference. 385 pp. \$12.95, hardcover. David McKay, 2 Park Ave., New York, NY, 10017.

BRIDGE PROGRAM

For those who would like to add my standardized bridge dealing sequence to their Duisman programs: If they will send me a check for \$3 (to cover incidental costs) I shall be glad to send the code. Thomas A. Throop, 8804 Chalon Drive, Bethesda, MD 20034.

GOMOKU FOR MICROS

Play an intelligent game at university level! Five Stones Software's GOMOKU program is available for North Star or CP/M in 5-1/4" single or double density disks or in 8" single density disks. Also available in cassette for TRS-80, Level II, 32K. \$29.95, any choice. Visa or MasterCard accepted. Five Stones Software, PO Box 1369, Station B, Ottawa, Canada, K1P 5R4.

OTHELLO FOR TRS-80

Intelligent OTHELLO opponent for both novice and expert. Five levels of play, neat graphical display, move selection in 30 seconds or less. TRS-80 tape (\$12) requires Level II and 16K and has **REAL-TIME Lunar Lander** program on flip side. Apple tape (\$16) requires integer BASIC and 24K and has OTHELLO for Disk system on flip side. Peter Frey, 2407 Prospect Avenue, Evanston, IL 60201.

BACKGAMMON CASSETTE:

The **GAMMON CHALLENGER** gives all backgammon players a battle. Has 3 levels of play. Switches sides, tests problems and stores positions in memory. Available on TRS-80 cassette for either Level 1 or Level 2. \$14.95 each. Computer Cablevision, 2617 42nd Street, NW, Washington, DC 20007.

The Challenge of Computer Go

David Brown is a lecturer in computer science at Teesside Polytechnic in England. Computer Go is a spare-time activity with Dr. Brown and he says that the program he is working on is still in its embryonic form. "My work," he explains, "focuses on the planning aspect of the problem. This aspect defines a framework for forming, executing and adapting plans in a two-person game. It also involves separating task-dependent aspects from the 'common-sense reasoning' apparatus." More on Dr. Brown's computer-GO will be forthcoming after his program has played its first complete game.

The following extracts Dr. Brown has sent to us are from an article he and Stuart Dowsey (a British Go teacher) wrote for the British Go Association.

"According to legend, Go was invented some 4000 years ago by a Chinese emperor to teach his son wisdom, or at least to knock some sense into his head. We do know that Go was sufficiently well established by 500 BC to earn mention in the philosophical works of Confucius. In the early days, the game was associated with astrology and fortune telling, an influence which lives on in Go terminology, but eventually the Chinese recognized it as one of three fine arts along with brush painting and music.

"The game of Go has reached its highest level of sophistication and popularity in Japan where an estimated 10 million people play. This broad base supports 500 full time professional players of grandmaster status, six monthly magazines, a weekly newspaper, four weekly nationwide television programs and thousands of clubs. Top professionals compete in a regular tourna-

ment circuit sponsored mainly by newspapers and television. The richest tournament has a prize fund of £450,000 of which 10 percent goes to the winner. Go is also taught in schools as an optional subject with the blessing of the Japanese Ministry of Education as the benefits include patience, good manners and logical thinking.

"Go is a very simple game. The rules are so straightforward that they have not been altered in 4000 years of play. Instead the game has steadily developed in depth and has won the fascination of more and more people. Played on a wooden board marked with a 19 x 19 grid, Go is a territorial game for two players. The playing pieces, black for one player and white for the other, are called stones and are played onto the intersections of the grid. The players compete for territorial control of the board. Starting with an empty board, they sketch out their areas, contest them and finally complete them, after which the winner is determined.

"When Go was first introduced to the West, it initially found favour with mathematicians and computer scientists. The discovery in Go of a simple logical game was especially appealing, and the game soon became the frequent subject of articles in mathematical and computer journals. The intellectual challenge of the game was inevitably taken up; people wanted to write a computer program that could play Go.

"The earliest attempt to produce a Go program was by Albert Zobrist in the late 1960s. Shortly afterwards, Jonathan Ryder, son of the president of the American Go Association, earned a doctorate from Stanford University for a thesis on Go programming. And at about the same time, two top British players, Jon Diamond and Tony Goddard, were responsible for a game played between two computers in Cambridge and London. The most ambitious effort so far however took shape in 1971 at the University of Michigan, Ann Arbor, and is still proceeding. There, Walter Reitman, an educational psychologist, established a programming team each member of

which was assigned a different aspect of the game. Reitman's assault on the intellectual heights of Go was reinforced when he was joined by Bruce Wilcox, a skilled computer scientist who learned Go especially for the project.

"Reitman, Wilcox and their colleagues have recently made impressive advances with their Go-playing program, and it is currently the world's best. Nevertheless, in human terms it is almost pathetically weak: anyone who has passed through the novice stage quickly learns how to outwit the program. Why, when computers can play a very passable game of chess, does Go remain beyond the reach of the electronic mind?

"Whereas chess can be seen as a single battle employing clever tactics. Go is an entire war made up of several interrelated battles: players need to concentrate not only on local import of moves, but also on global significance. The importance of overall strategy, especially at the beginning of the game when positions are being established, is therefore paramount in Go. Tactics come to the fore later in the game when localized skirmishes are being fought.

"The global nature of the game demands an ability to recognize patterns, a clear perception of the possible structures that can be created from early scattered foundations. Japanese Go players sit straight-backed when playing the game, surveying the form of the whole board. By contrast, Westerners, and especially chess players, often crouch over the board scrutinizing just a small area, a myopic approach that makes sound strategy almost impossible.

"Although with the symmetry of an empty board the first player need only consider 46 points for his initial move, as stones are added symmetry is quickly lost and throughout the game the number of available places to play varies between 150 and 300. We estimate the number of possible games of Go to be of the order of 100^{700} , rather a large number! What is more important is the huge (150-300) number of legal

News on "Intelligent" Games of Backgammon, Checkers, Gomoku, Go, etc., welcomed by this department. Computer Chess and Computer Bridge appear separately. Address all correspondence to Computer Games Dept., Personal Computing.

moves at each position. Whereas the smaller limit of 30 for chess makes it possible for computers to search all chess sequences of seven moves, they could not even manage to look at all sequences of three moves in Go (8 million). This means that the brute-force approach is a no-hoper even if computers become a hundred-times faster than they are now.

"Many factors come into play when one assesses a position: the stability of groups of stones, their influence on other groups, the size and significance of territorial frameworks, the actual territory available, and the prisoners—all play vital roles. It is clearly unreasonable to expect that all these elements could be combined into some kind of equation whose value can be traced back through a look-ahead tree.

Instead, what is needed is a method of formulating goals and finding moves to achieve them. We are attempting to develop this idea.

"Our program, which is still under development at Teesside, uses a network representation of the concepts that humans use during play. The nodes of the network represent primitive entities (such as stones, groups, walls and territories) at many levels of abstraction, their properties (such as strength and stability), and relationships between them (such as enclosures, linkages and support). The arcs of the network represent structural and causal relations between entities and relationships. By exploiting dynamic analysis we can recognize complex properties such as group safety. For example, to see if one of its groups is impervious to

threats of capture, the program sets up a goal of capturing it and looks at this goal from the opponent's view. Performing the analysis also helps the program find enemy moves it must guard against.

"Our program presents no serious threat to the world's champions. We have left untouched so many subtleties of the game that cunning opponents will easily outwit it. What we do hope is that by experimenting with the design, we will gain a little insight into the problem of constructing an artificial intelligence. Quite apart from the desire to produce a program that can direct a respectable game of Go, the inexhaustible variety, subtlety and sophistication of the game is providing one of the most fertile areas for the development of knowledge engineering."

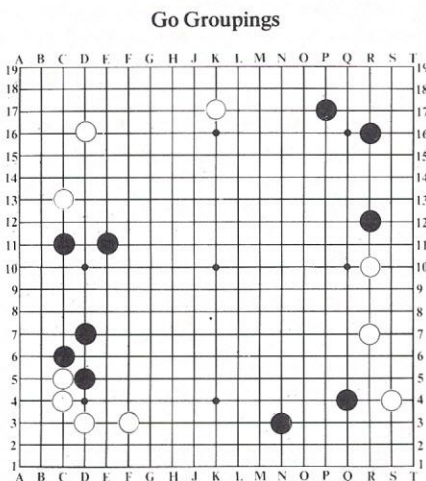
Conception vs. Perception

A query to AI Zobrist, last, year, regarding his current activity in Computer Go, resulted in the following response from him:

"I managed to dig up listings of two old games played by my GO program in 1969." (The complete listings will appear in a future issue.) "The machine was a Burroughs B-5500. The Reitman and Wilcox programs seem to be a little better but advances in Computer Go have not been as spectacular as those in computer chess. This relative lack of progress may be due to a corresponding lack of activity by researchers and programmers. However, I believe that GO poses some special problems for mechanization.

"At the most basic level, Go play must take into account the groups of stones on the board. In the enclosed figure, the twenty stones fall into six natural groupings, and black's next move will reflect an effort to expand, consolidate, attack, defend and/or extend the influence of these groups. Human vision does an excellent job of converting the matrix of stimuli at the retinal level to objects at the level of 'thinking'. How should the computer do this?

"In 1968 I adopted a simple numeri-



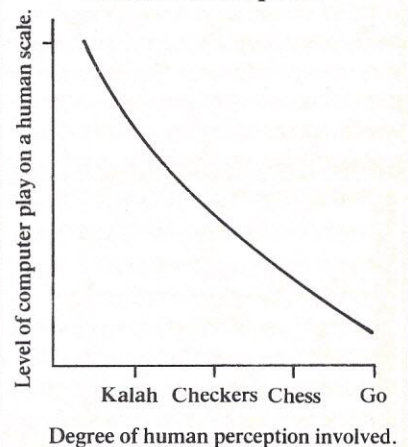
An illustration from professional play. Black and white are sketching out as much territory as they can with as few stones as possible. Note how the stones have marked off six domains on the board.

cal scheme to simulate this perceptual grouping process. The Go stones were treated as sources of positive and negative digits which were propagated in four waves to neighboring points. The connected areas of positive and negative numbers defined the groups of stones and gave an indication of their strength or influence as well. I doubt that Go can be automated at a non-triv-

ial level without a grouping mechanism similar to mine. This contrasts to chess and checkers, which can be automated to an expert level by purely logical processes such as lookahead and minimax.

"Two basic questions are lurking here. First, what are the relative values of logic and perception to human game play? Does a master of chess or Go apply more logic than his inferiors or does he use a sophisticated perception

Computer Play Compared to Human Perception



of the pieces on the board? Evidence is that perception is dominant. The second question is: will computers achieve mastery of complex games such as chess and Go? Also, will mechanisms or programs operate in a fashion similar

to human perception or will they substitute incredible feats of logic for simple acts of perception?

"To illustrate these matters I offer an interesting curve relating the ability of computerized game players to the de-

gree of perception involved in human play. The argument that these games are also increasingly complex does not hold water. I could design an incredibly complex game that would be duck soup for a computer!"

Zobrist Program in Action

One of the two Zobrist games was sent to Bruce Wilcox for comments and comparisons to the performance of his own program. Bruce now at Intermetrics in Cambridge, was formerly at University of Michigan where, with Walter Reitman, he helped to write a Computer GO program (considered now to be the best in the world.)

"Zobrist's program in this particular game will take forever to lose. Against a strong player it disintegrates from playing meaningful Go. Because both players are novices, the first game is decided by move 60+. The endgame, which went to move 269, merely fills in the exact details of boundaries already clearly laid.

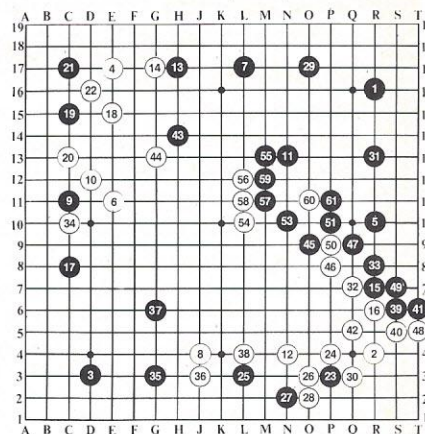
"Commenting on a game between two novices is harder than doing so between two strong players because almost every move is wrong in some way. Either the objective is wrong, the timing is wrong or the implementation is wrong. The trick is to pick some consistent set of things to discuss in an attempt to help the beginner, and ignore the rest. The program plays Black to good advantage in the opening game.

The general phase of sketching out territorial zones is handled well enough to completely outflank the human. The program's weakness is a total disregard for local fighting situations, but the human is also poor in following them up, so the program doesn't suffer as much as it should.

Game #1: Zobrist Program
(Black stones and odd-numbered moves.)
vs. Stuart Shapiro
(Rating 35 kyu, Playing white stones
with even-numbered moves.)

		R16
2.	R 4	D 3
4.	E 17	R 10
6.	E 11	L 17
8.	J 4	C 11
10.	D 12	N 3
12.	N 4	H 17
14.	G 17	R 7
16.	R 6	C 8
18.	E 15	C 15
20.	C 13	C 17
22.	D 16	P 3
24.	P 4	L 3
26.	O 3	N 2
28.	O 2	O 17
30.	Q 3	R 13
32.	Q 7	R 8
34.	C 10	G 3
36.	J 3	G 6

A Computer Go Program (black) Beats a Human (white).



Game moves are shown in order of play.

38.	L 4	S 6
40.	S 5	T 6
42.	Q 5	H 14
44.	G 13	O 9
46.	P 8	Q 9
48.	T 5	S 7
50.	P 9	P 10
52.	N 8	N 10
54.	L 10	M 13
56.	L 12	M 11
58.	L 11	M 12
60.	O 11	P 11
etc.		

Analysis of the Zobrist Game

BY BRUCE WILCOX

(Shown are move numbers: W6=White's 6th move. Also shown are coordinates: E11=stone placed on file E, rank 11)

W6(E11): This is abnormal. Normal opening moves all occur on the 3rd or 4th lines. The 3rd line secures territory, the 4th secures influence. This 5th line move allows an easy scooping out on the 3rd line by Black, as is done by B9(C11).

B11(N3): Black should react at C12 to keep White from using his W4&W6 stones to build a large corner territory. Anytime enemy stones are within "radius 1" of a stone (in this case with respect to C11 the points C10,D10,D11,D12,C12,B12,B11,B10) then a "con-

tact fight" exists. White has just flung a punch at Black, who has failed to defend himself. Stones in a contact fight are safest with at least 5 liberties. C12 gains this for Black and chews out White's possible territory.

B13(H17): The same contact fight principles apply. Black should react to W12 with possible plays at O3 and M3 for safety, or O4 and M4 for aggression. Black keeps ignoring these tactical details because the program is driven to create favorable influence, but has no sense of the proper foundations for the safety of the influence.

W14(G17): This is much too small. General rules of the opening say to play in the widest open spaces. The space here is only 2, whereas places between, say, B5 and W2 (R10 and R4) are 5 spaces wide.

B15(R7): Same contact fight flaw. Should be at H16, which both secures Black's stone, supports Black's

WANTED:

BUSINESS PROGRAMS

Personal Computing readers want your business applications programs. Chances are, the software you've developed to solve your business problems will also help someone else faced with a similar problem.

Consider how your business benefits from your microcomputer — not only in the obvious areas of inventory, accounting and payroll, but in all departments and levels right up to the president's desk. Financial and marketing analysis, time management, planning, materials handling, product design and cost accounting are areas ripe for creative programming. Readers want help with all of these problems.

So why not share your solutions with our readers? Send us an article describing the problem you faced and how you used your microcomputer to solve it. Be sure to include a program description, program listing and sample run.

Remember, readers aren't familiar with your program. So explain in detail what the program does and how it does it. Include here the overall structure of your program as well as any special algorithms or routines you've used. Give suggestions for modifying or expanding the program for other applications, other businesses or other situations.

All submissions should be original, typed (not all CAPS), double-spaced and neat. Include your name and address on the first page of the article and enclose a self-addressed, stamped envelope for return of material. Also, please use a fresh ribbon on your printer for program listings and sample runs.

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Boston, MA 02215

upper-right potential and aims to invade White's upper left potential.

W16(R6): Same small-mindedness. C12, C5, F3, are all better open spaces.

W18(E15): Since White's strategy of containment is undercut by B9(C11), this move is premature. White must first play at C12.

B19(C15): This is asking for trouble. B13 would scoop out White's territory nicely. B19 merely gets cut off and dies.

B23(P3): ??? Black lets his group die in the upper left corner.

B27(N2): The obvious move would be to protect the connection between B11(N3) and B23(P3) with a move at O2.

W28(O2): This is where being human comes in handy. White knows what he is trying to do and follows it up until it is accomplished. The program keeps stopping one thing to do another, and never ends up doing one thing properly. It is this difference that is the only saving grace for White in the game. But it is not enough.

B29(O17): Since Black controls both ends of this open area (L17&Q16), he should play on a bigger scale. H16, L15, etc., all try to swallow the area in a large way. Then Black should try Q7, Q10, etc., to erect the second wall. Finally M11 or so would complete the roof. Then the territory would be huge!

W30(Q3): Overkill. Black is already dead here.

B31(R13): Same small scale as B29.

B35(G3): Another example of ignoring tactics. Should be at B10 or D10 to regain connection to safety.

W36(J3): This is a move Black is incapable of playing. White wants to capture Black and so blocks the escape route. Visually, it's obvious to a human; not so simple for a computer.

B37(G6): Now that Black has run out of extension areas, he moves out into the center. This is the right idea, although the larger area to attack is the upper right.

B39(S6)-W41(Q5): Small potatoes. They should both work on center area.

B41(H14): Right idea again, although the actual move choice is not the best. Better not worry about that for now, though.

W44(G13): Wrong direction. White should come in from the other side (at P9 for example.)

B45(O9): Black has the right idea, and will actually succeed in getting all he is claiming. Black wins by 35 points at move 269. He controls a huge upper right side/center and a larger lower right one. White has the upper left corner and the lower right. Black's general knowledge of how to sketch out the game is much better than White's and easily beats White's superior tactics. It would take only a few games, however, for White to catch on and then the computer would not do so well.

Duisman Deals Again

BY THOMAS A. THROOP

This month let's look at a few more deals played against the Duisman program modified with my standard dealing sequence. I'll discuss deal 75 at 3 no-trump, deal 80 at 3 no-trump, deal 86 at 4 hearts, and deal 87 at 4 spades. If you have not yet played these deals and have my standard dealing sequence, you might like to play them before reading further.

Deal #75:

NORTH (Dummy)	
♠ AKJ7	
♥ J10	
♦ 974	
♣ AQJ9	

COMPUTER WEST	COMPUTER EAST
♠ Q10862	♠ 954
♥ 832	♥ 9754
♦ K3	♦ A1085
♣ 853	♣ K10

SOUTH (Declarer)	
♠ 3	
♥ AKQ6	
♦ QJ62	
♣ 7642	

The Duisman program leads the 6 of spades against the 3 no-trump contract. With a singleton spade in your hand, you should finesse with dummy's jack at trick 1. When this wins, you now should be able to win 10 tricks, if you play carefully. The only sure way of reaching your hand for the club finesse is in the heart suit. Therefore, at trick 2 you should cash one of dummy's good hearts and lead another heart to enter your hand by leading another heart.

Now, be very careful. You mustn't finesse for the king of clubs yet! If you do, let's see what happens. When you play a small club from your hand, West plays small, you play the queen or jack from dummy, and East wins his king. As East, the Duisman program now returns the 9 of spades, which you win in dummy. Now do you see your problem? By the time you can force an entry

to your hand to reach your good hearts, perfect defense would win two spade tricks and two diamond tricks in addition to the already won king of clubs to set you one trick. Actually, the computer will not find the correct defense; it requires a very good play by East, one many human players would miss. After winning the fifth trick with the ace or king of spades, your best play is a low diamond from dummy. If East has one of the top diamond honors and does not rise up with it, you will make 10 or 11 tricks. However, if East does put up his honor and continue spades, then West wins your next diamond lead and cashes two good spades to defeat your contract.

You'll avoid these difficulties if you are alert enough to cash all of your good hearts before finessing for the king of clubs. Then you will make 10 tricks against any defense. How did you fare on this deal?

Deal #80, played at 3 no-trump:

NORTH (Dummy)	
♠ AKJ8	
♥ K107	
♦ A6	
♣ QJ87	

COMPUTER WEST	COMPUTER EAST
♠ 63	♠ 10952
♥ 653	♥ Q82
♦ KJ1052	♦ Q7
♣ 1064	♣ A952

SOUTH (Declarer)	
♠ Q74	
♥ AJ94	
♦ 9843	
♣ K3	

This deal is probably the most interesting I'll discuss this month. Against your 3 no-trump contract the Duisman program opens the 5 of diamonds from West. How did you play this deal?

You should duck the diamond lead in dummy at trick 1. East plays the queen, winning the trick, and returns the 7 of

diamonds, which you win with dummy's ace. You have 7 top tricks; your problem is how to develop 2 more. Should you finesse for the queen of hearts or drive out the ace of clubs?

Here is the reasoning you should follow. You would like to keep West, who presumably has the long diamonds, out of the lead. Suppose you attempt to set up two club tricks by driving out the ace of clubs? To a first approximation, East will have the ace of clubs one-half of the time. If West began with 5 diamonds, then, after winning the ace of clubs, East will not have a diamond to return to West, and your contract is safe. If West began with only 4 diamonds, then East will have a diamond to return to West, but the defense will be able to win only 3 diamonds and the ace of clubs. Approximately half of the time West will have the ace of clubs. Then, if West began with 5 diamonds, you are down. Thus, if West began with 5 diamonds, attempting to set up two club tricks offers approximately a fifty percent chance of success.

Now suppose you consider finessing for the queen of hearts? You would like to guess the location of the queen successfully, but, if the finesse loses, you would like it to lose to East! Then, if East began with only 2 diamonds, your contract will depend on the location of the ace of clubs. To a first approximation, the chance that the finesse will lose to East and that West will hold the ace of clubs is 1 in 4, or twenty-five percent, meaning that the chance of this not happening is 3 in 4, or seventy-five percent. In other words, the finesse for the queen of hearts before playing clubs (if necessary) will fail only when both the queen of hearts and the ace of clubs are unfavorably located, whereas playing clubs first will fail whenever the ace of clubs is unfavorably located. Two unfavorable events are less likely than one unfavorable event. Thus, the proper line of play is to finesse for the queen of hearts first, playing clubs only if the heart finesse loses.

The tableau below shows the proper

line of play just discussed and the defense by the Duisman program when I played the deal on my TRS-80:

	W	N	E	S
Trick 1	5D	6D	QD	3D
2	2D	AD	7D	4D
3	3S	KS	2S	4S
4	6S	8S	5S	QS
5	3H	7H	QH	JH
6	4C	7C	2C	KC
7	5H	JS	9S	7S
8	6H	AS	10S	8D
9	10D	KH	2H	4H
10	JD	10H	8H	AH
11	6C	8C	5C	9H
112	10C	JC	AC	3C
13	KD	QC	9C	9D

Contract: 3 no-trump

Tricks N-S: 10 Tricks E-W: 3

Notice at trick 5 on the finesse for the queen of hearts it is important to lead the jack or the 9 rather than the 4. If the finesse succeeds, you wish to remain in your hand if West plays small and you play the 7 from dummy. Then you will

be able to repeat the finesse at trick 6.
Deal #86:

NORTH (Dummy)		COMPUTER		COMPUTER	
		WEST		EAST	
♠	QJ102	♠	K986	♠	54
♥	AK54	♥	J106	♥	97
♦	K103	♦	J965	♦	AQ74
♣	84	♣	Q9	♣	J10652
SOUTH (Declarer)					
♠	A73				
♥	Q832				
♦	82				
♣	AK73				

The Duisman program opens the 5 of diamonds against your 4 heart contract. You play small from dummy and East wins with the queen. The program, as East, now returns the 4 of spades. What does this play mean? If you believe that it might be a singleton, perhaps you should refuse the spade finesse and go up with the ace of spades. If the hearts break 3-2, you will lose only 2 diamond tricks and the king of spades. On the actual deal, as you can see, playing a small spade at trick 2 to finesse for the king is alright. West wins with his king, and the program then plays the 6 of diamonds. You should play the 10 from dummy, which loses to East's ace. East now plays the 5 of spades. You win this, draw trumps, and have the rest of the tricks with proper play.

Deal #87:

NORTH (Dummy)		COMPUTER		COMPUTER	
		WEST		EAST	
♠	642	♠	K75	♠	3
♥	KQJ32	♥	6	♥	A1095
♦	A65	♦	K9873	♦	J104
♣	A6	♣	J872	♣	Q10543
SOUTH (Declarer)					
♠	AQJ1098				
♥	874				
♦	Q2				
♣	K9				

Against your 4 spade contract the Duisman program opens the 6 of hearts from West. East wins the ace of hearts and returns a heart, which West ruffs. West now leads the 3 of diamonds. What did you play now?

You must not take the chance that East has the king of diamonds. The success of the contract depends on the spade finesse. If it succeeds, you will make 5, discarding your losing diamond on a heart which you can establish. If it loses, you will be down 1 or 2, depending on who has the king of diamonds and how many trumps West originally held. Therefore, at trick 3 you must play the ace of diamonds from dummy and then finesse for the king of spades. This loses to West's king, who cashes his king of diamonds to set you.

For those of you who would like to add my standardized dealing sequence to your Duisman program, please note the announcement in the Chess Classifieds. This sequence will allow you to generate easily the deals played against the Duisman program which I discuss in this column.

One of the letters I received this month was from John Lyons of 116 - 2050 Upper Middle Road, Burlington, Ontario, LP7 3R9.

John says, "You made the comment in one of your columns that you felt that bridge is a more complex computer problem than chess. Given the wide variety of playing strategies, the uncertainty of unlocated cards, and the vagaries of one's opponents, I heartily agree! Chess is a problem of extrapolation from known information. The quality of play is limited by the size of combinatorial search and the sophistication of heuristics. Bridge, on the other hand, is a problem of inferring information which is not directly available. It is the probabilistic nature of the game that gives rise to such a wide range of approaches to play. I recently read a book which identified over 25 basic finesses!"

John's comments are correct; I mentioned last month that at least two manufacturers have underestimated the difficulty of programming bridge.

Keep on sending me your comments on commercial bridge products or on your own bridge software. I'm always glad to pass along these comments to other readers of this column.

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CIRCLE 30

1984 – The Problems in Computing

— BY WILLIAM R. PARKS —

In 1948, George Orwell wrote a book entitled, *1984*, describing conditions existing in a society of the future ruled by an authoritarian government. The loss of individual liberty in the society was tied to a network of TV cameras being monitored 24 hours a day. "Big Brother" (i.e., the government) was not only controlling behavior, but also thought processes through various methods.

While this novel centered much attention on a relatively new (back in 1948) technological device, television as a means of controlling people by constant monitoring, the whole point of Orwell's story can easily be transferred to another more recent technological device — the home computer.

Imagine for a moment how a totalitarian regime could introduce its citizenry to home computers on the pretext of game playing and education, but eventually use this new technology for monitoring their communications or even control thought through cleverly devised computer programming, much the same as is done in some foreign news-reporting broadcasts.

The potential for evil through the computerization of any society is as great as any other mass movement brought on by revolutionary changes. History records the potential for good and bad outcomes from the same human inventions. For example, the invention of dynamite helped in construction (a good thing) and also enhanced weapons of war (a bad outcome).

In past columns I have stressed the good side of computing. In this installment let's take some time to discuss potential evil uses of computing. After all, a well informed citizenry should not only consider the good potential outcomes, but also the potential abuses that will affect its people in any new venture. The inevitable total computerization of society is not far away in time. I predict that home computers will soon be as commonplace as telephones are today.

Is it possible that the computer might become an oracle of future societies?

Some persons may be misled by the awesome powers of modern computers and view these machines in the same way the ancient Greeks believed in oracles. Will people create a kind of religious cult around a subject that really should be just another science?

In my 20 years of work in the computer field, I have met many highly qualified specialists who are very knowledgeable in computer science and are moving in the right direction. However, on some rare occasions, I have met respected specialists who are committed to the philosophy that computers are meant to become a mysterious super race of thinking beings that will take control over many of the important things men and women do in life.

This latter philosophy believes computers can think like humans and even discover truths we mere mortals can't. However, it is not the computer which makes new discoveries, but the programmer or software written by the programmer, a human. Therefore, he or she is the true discoverer. Personally, I dislike the notion of separating the programmer from the program he wrote and attributing everything to the computer — a responsible computer scientist will recognize the difference. Computers are not personally aware or responsible for their actions — that belongs to the human user or programmer.

Computers should elevate humanity to a higher level of experience in life — a greater understanding of ourselves. Where these machines diminish our capacity to function properly or inhibit our own potentials for greatness is the place where computers are not properly implemented.

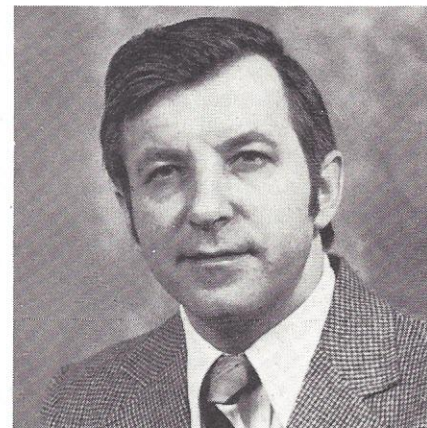
Because of people's importance in any organization, systems analysts place a great deal of emphasis on finding out what the users of their designed systems want by constantly asking them for both negative and positive feedback. Every good computer systems analyst knows the importance of interviewing in depth the future users of the systems he designs. Without such

important feedback, good systems are almost impossible to create. The user must be consulted before, during and after a new computer system is installed.

Needless to say, if such a philosophy were adopted worldwide, certain totalitarian political systems would be drastically changed by the citizens who use the system that they are unfortunate to be living in. This systems philosophy not only applies to computer systems, but political or social systems as well. Whatever can go wrong with the latter two systems can also go wrong with computer systems. (Murphy's law states something like this in the context of computerized systems).

Computer science is not immune to false teachings even by respected authorities. Our internal "crap" detector, our conscience, will have to be ever vigilant against the potential evil directions and plans for the use of computers. Computing ethics and the morality of computer programming projects will become important issues in the future.

In a free society, it should become obvious that computer scientists, computer programmers, users, hobbyists and consumers will have to speak out whenever any apparent false doctrines or abuses show up in the computerization of society. □



Professor Parks is in the Department of Mathematics and Computer Science at Fredonia State University College, Fredonia, NY.

WHAT'S COMING UP

SOFTWARE

Language Teacher

Language Teacher, introduced by Acorn Software Products, Inc., is a series of language tutorial programs on disk for the Radio Shack Model I TRS-80.

Initial programs in French, Spanish, German and Italian feature a drill learning format, with language-to-English or English-to-language usage options. Each program offers hundreds of word combinations, phrases and verb conjugation forms to inform and challenge the student.

Language Teacher's capabilities make it a sophisticated language disk program that not only provides full record access, but also has optional printing features.

Of special interest to teachers is the feature enabling you to print out a multiple choice test. Students and teachers can run a full quiz diagnostic routine.

More advanced programs are under development for those users who master this first in the Language Teacher series. Programs are priced at \$19.95. For more information contact Acorn Software Products, Inc., 634 North Carolina Ave., S.E., Washington, DC 20003; (202) 544-4259. *Circle No. 170*

TRS-80 Mailgram Messages

Radio Shack's TRS-80 Model I microcomputer system will soon be able to originate Mailgram messages when used with Radio Shack's new TRS-80 Mailgram software.

Mailgram service, developed jointly by Western Union and the U.S. Postal Service, lets you send a message electronically to a post office near an address anywhere in the United States (including Alaska and Hawaii) and Canada for delivery with the next business day's mail.

The TRS-80 software application will allow small businesses to utilize electronic mail for customer relations, sales, administration and personnel, credit and collection, purchasing and expediting orders and so forth.

Minimum system requirements to originate a Mailgram message include 16K Level II TRS-80 Model I with either cassette recorder or disk drive, an expansion interface, RS-232-C serial interface board and the Telephone Interface II. An optional printer may be included if hard copy printouts of messages sent are desired.

Once you have established an account with Western Union Electronic Mail, Inc., a subsidiary of Western Union Corporation, the TRS-80 can be used on-line through the Western Union facility as a word processor to compose letters for transmittal as Mailgram messages, or to transmit previously stored message texts. The user is billed by Western Union Electronic Mail, Inc., for the actual Mailgram messages sent each month.

Western Union Electronic Mail's Stored Mailgram service provides computer storage of a customer's frequently used letter texts, key paragraphs, mailing lists, and sender names and titles for transmittal as Mailgram messages when required by the customer.

Rates for stored Mailgram service vary, depending on whether stored lists, stored texts or all non-stored information is involved. TRS-80 users will enjoy lower rates than those available to the general public. Additionally, these low rates can be reduced even further depending on volume of Mailgram messages generated.

Price for the package is \$49.95. For further information contact your local Radio Shack Computer Center or Radio Shack, 1300 One Tandy Center, Fort Worth, TX 76102; (817) 390-3272. *Circle No. 153*

Program Control Software for Apple II

Full control of the running and listing of Apple II programs is available through the Video/Print/List Controller by Howardsoft. The new controls are activated by keyboard commands, providing control of running and listing speed, listing format, line printer action and cursor movement.

Specific features include suspend/resume via space bar, variable speed via game paddle, vertical colon alignment, compact listing, rapid cursor movement, instant printer on/off during running, dump of screen onto printer and display of useful memory points.

This machine language software is compatible with both Apple II and Apple II Plus computers, and will work with Integer Basic, Applesoft and Assembly languages as well as the Apple Monitor. It is available now on disk or tape for \$39, postpaid. For more information contact Howard Software Services, 7722 Hosford Ave., Dept. P, Los Angeles, CA 90045. *Circle No. 144*

New Prices for Pearl Software

Computer Pathways Unlimited, Inc. announced new prices and availability of levels of Pearl software effective July 1.

Pearl (Producing Error-free Automatic Rapid Logic) is an applications generator for microcomputers and runs under CP/M on any microcomputer with 48K. An introductory pricing schedule for Pearl has been in effect since the introduction of the package in January, according to the company.

Pearl requires you to define the system to be created through response to a series of on-screen menus and prompts. Pearl then generates all new source code, in Basic, providing error-free applications software to the end user, and integrated program modules designed for use by programmers who may wish to further customize the generated system.

The package is available in three user levels. Pearl Levels 1 and 2 are available now; Level 3 will be available mid-summer. Features of Level 4 have been combined into Level 3, which is designed for use by those with strong programming backgrounds.

Prices are: Pearl manuals \$25, Pearl Level 1 (entry level) \$130, Pearl Level 2 (programmers) \$350, and Pearl Level 3 (advanced software developers) \$650.

For additional information contact Computer Pathways Unlimited, Inc., 2151 Davcor St., SE, Salem, OR 97302; (503) 363-8929. *Circle No. 147*

TRS-80 Editor Assembler

EDAS 4.0 by Galactic Software Ltd. is a RAM-resident text editor and assembler for the TRS-80 Model II running under TRSDOS.

The editor provides text editing facilities for the modification of alphanumeric text files. Command syntax is identical to the Model II's Disk Basic editor. EDAS also provides text block move, global change, string search and line scroll capabilities.

The assembler portion of EDAS facilitates translation of Z-80 symbolic language (Zilog mnemonics) source code programs into machine executable code. Assembler switches provide you with options to suppress source and symbol table listings, suppress object code generation and output the assembled code directly to memory or disk.

All TRSDOS commands are directly executable from within EDAS. This feature gives you the capability of displaying directories, listing files, setting forms or any other command without exiting the environment of EDAS. Interfacing to DEBUG has been provided to enable a direct approach to debugging user generated code.

EDAS is available for \$229. For more information contact Galactic Software, Ltd., 11520 N. Port Washington Rd., Mequon, WI 53902; (414) 241-8030. *Circle No. 141*

Microcomputer Software Package for Dentists

Graham-Dorian Software Systems has introduced a computer software dental package written and tested by dental professionals. It handles patient records of charges, payments, insurance, delinquent accounts, and daily and monthly transactions. It prints out patient statements and standard insurance forms for the American Dental Association.

The package can be ordered on standard 8" disk or various mini-floppy disks. Each package includes the software in INT and BAS file form plus a user's manual and hard copy source listing for easy customizing. The package utilizes a two-disk storage system. Disk A stores programs and user-entered ADA uniform procedure codes. Storage capacity on Disk B, based on 8" single-density disk drive, is 1200 patient records and 2100 treatment and payment records.

Price is \$1000. For more information contact Graham-Dorian Software System, Inc., 211 N. Broadway, Wichita, KS 67202; (316) 265-8633. *Circle No. 240*

VisiCalc for Commodore and Atari

VisiCalc, Personal Software Inc.'s software package that turns a personal computer display into an interactive electronic worksheet, will be available in versions that run on Commodore Pet and CBM Model 8032, and Atari 800 personal computers.

Like the Apple II version, the new VisiCalc software creates a 64-column wide, 254-row high matrix on the screen of a personal computer. Business managers, planners and engineers have been using VisiCalc instead of a calculator, pencil and paper to speed and simplify repetitious calculations like inventory planning, sales forecasts, financial

analyses and modeling of physical phenomena, the company said.

The complex conversion of VisiCalc to run on Atari and Commodore computers was done by Software Arts, Inc., the Cambridge, MA firm that developed VisiCalc for Personal Software. Personal Software has exclusive licensing agreements to publish and distribute the program.

The new VisiCalc programs are operationally identical to the Apple version. The Commodore version automatically senses whether it is running on a Pet machine with a 40-character wide screen, or on a CBM Model 8032 which has a screen that is 80 characters wide.

Each package contains an instruction manual that includes a step-by-step tutorial for first-time computer users, and an expanded reference section organized by program feature to aid experienced users. System requirements are a minimum of 32K for each machine and a disk drive.

Prices for the packages are under \$200. For more information contact Personal Software, Inc., 1330 Bordeaux Dr., Sunnyvale, CA 94086; (408) 745-7841. *Circle No. 237*

Inventory System for Apple II

Micro Business World announced their Inventory Control System for the Apple II.

The program will handle up to 8100 items, has a transaction register and audit trails. In addition, it will generate inventory status reports, reorder parts and keep track of purchase orders automatically.

The program may be used in a retail or wholesale environment, will handle multiple departments or divisions, has fact data retrieval, and can be learned in less than two hours, the company said.

Minimum hardware requirements are an Apple II Plus with 48K, one disk drive and an 80-column printer. Price is \$99 including a comprehensive manual. For more information contact Micro Business World, 15818 Hawthorne Blvd., Lawndale, CA 90260; (213) 370-4842. *Circle No. 131*

Genealogy Program for Apple

AppleRoots is a genealogy software package that can be used for conventional genealogy as well as animal breeding.

AppleRoots has 17 user definable fields that allow you to specify the title and length of the field. The program will default to 17 titled fields.

Functions include: (1) configure system, (2) enter records, (3) change records, (4) delete records, (5) print index or records, (6) print list of children, (7) print family records and (8) print four-generation pedigree chart. All printer functions can be displayed on the screen or sent to the printer. All functions are menu oriented and no programming is required to configure the system for your personal use.

The package, written in Applesoft, requires a single disk drive with 24K RAM and costs \$39.95. For a demonstration or brochure see your local Apple dealer or contact CDS Corp., 695 East 10th North, Logan, UT 84321; (801) 753-6990. *Circle No. 231*

Math Program for TRS-80

A K-8 (kindergarten through eighth grade) math program designed for use in a classroom environment to supplement regular instruction is now available for use with the Radio Shack TRS-80 Microcomputer System.

According to Radio Shack, a review of educational programs was conducted to identify the sequential development of each function and associated skills, as well as to identify the math concepts to be covered. Extensive field tests have proven highly favorable.

The program is not intended to replace formal instruction, but to provide a strategy for practice to further develop the math skills being taught in an institutional or public school setting. The computer supplements regular classroom activities by drilling students on new concepts and reinforcing those concepts.

Part one of the program is a series of computer programs containing skill building exercises in numeration, addition and subtraction concepts for use in kindergarten through third grade. Part two contains skill building exercises, a testing mode and a placement mode for addition, subtraction, multiplication and division, appropriate for use in grades one through eight.

Hundreds of different problems are generated in a progressive sequence. Students are graded on performance and automatically promoted or demoted, based on a minimum number of problems and a minimum or maximum score. Wrong key inputs are detected and appropriate messages given. Reinforcement messages are keyed to student answers.

Instruction is individualized so students move at their own pace. They are constantly challenged, but never threatened. If a student doesn't respond after about 15 seconds, a series of prompting messages appear, for example, "come on, try one" or "don't go to sleep."

A comprehensive reporting function is also provided. At the end of a student session, the screen displays the total number of problems attempted, the number correct, the percent correct, any promotions or demotions and average response time.

K-8 Math is supplied on five cassettes and three disks in a binder with a teacher's manual containing complete instructions and sample record keeping forms. It requires a 16K Level II TRS-80 Microcomputer System (disk drive optional).

K-8 Math Program is priced at \$199 and is available from participating Radio Shack stores, dealers and computer centers, nationwide. For more information contact Radio Shack, 1300 One Tandy Center, Fort Worth, TX 76102; (817) 390-3272. *Circle No. 171*

Labelmaker Software for TRS-80

Labelmaker, by The Peripheral People, is written to allow you to start a small home business maintaining mailing lists and supplying gummed mailing labels to customers.

The Labelmaker program permits rapid entering and error correction. All names in memory can be sorted alphanumerically or by zip code in less than ten seconds, and the printout

is in tabular form on label stock with a selection of labels 1-4 across. There is provision for a test run to permit label alignment.

One feature of Labelmaker is the ability to code each record and selectively printout labels for names having the user-assigned code.

Labelmaker is priced at \$99.50. The Peripheral People offer a full refund if the software does not perform as advertised. System requirements are a TRS-80 with at least one disk drive and a minimum memory of 32K. For more information contact The Peripheral People, P.O. Box 524, Mercer Island, WA 98040; (206) 232-4505. *Circle No. 168*

Chemistry Lab Simulation

High Technology, Inc., has announced two computer programs for education, Chemistry Lab Simulation #1 and #2, both for use on the Apple II computer.

Developed by Dr. John I. Gelder, an Oklahoma State University chemistry professor, the programs provide simulations of high school and college level chemistry lab experiments, allowing the student to interactively discover the chemistry principles involved. The programs may be used either as an aid in lecture presentations or for individual study.

Chemistry Lab #1 uses high-resolution graphics to simulate introductory level chemistry experiments including acid-base titration; a monomolecular film experiment used for the determination of Avogadro's number; and finding an unknown weak acid by determining its equilibrium constant. The program provides randomly generated initial values, giving unlimited test results without repetition.

Chemistry Lab #2 visually illustrates the dynamic behavior of gas particles as you vary the gas environment. This simulation and the user's manual are designed to guide the student to an understanding of the Ideal Gas Law, the Kinetic-Molecular Theory and the principles of entropy. The program features low-resolution graphics and is written in machine language for fast response time.

Both programs are priced at \$100. For more information contact High Technology, Inc., P.O. Box 14665, Oklahoma City, OK 73113; (405) 840-9900. *Circle No. 165*

Word Processing Software for TRS-80

A new version of the WpDaisy Word Processor software package, designed for use with the Radio Shack TRS-80 Model II microcomputer, has been announced by InfoSoft Systems, Inc.

With its disk handling capabilities, you can change diskettes, list directories of all disks in the system, write files to any disk in the system and review any file on the CRT screen. The system can also create back-up documents automatically. All or any part of any text can be moved to any disk under a selected file name, either as is or formatted.

The word processor facilitates the creation of documents, easy revision and full preview on the CRT screen. In addition, documents and manuscripts can be fully justified when a letter quality printer is employed, the company said.

WHAT'S COMING UP

The complete WpDaisy package includes InfoSoft Systems' I/OS Disk Operating System, a basic operating system for 8080, 8085 and Z-80 CPUs. I/OS is compatible with much of the application software currently available for these CPUs, features support for the letter-quality NEC Spinwriter, Qume and Diablo daisy wheel printers, and a printer spooling capability which allows the printing of a disk file at the same time other operations are performed.

For a limited time, the package will include Mailmerge, a system that facilitates the creation and maintenance of mailing lists and the development and printing of form letters, the company said.

Also available for an additional charge of \$75, is an intelligent terminal software package which enables the TRS-80 to function as a terminal in any conventional computer timesharing system.

The package is available through microcomputer dealerships or from the company. Price is \$550. For more information contact InfoSoft Systems, Inc., 25 Sylvan Road South, Westport, CT 06680; (203) 226-8937. *Circle No. 162*

Dump/Modify Utility for TRS-80

Definitive Micro Systems has announced "Suprdump," an interactive disk dump/modify utility for the TRS-80 Model I. Suprdump is designed for debugging programs utilizing disk files. It is also useful as a tool to create disk file test data, said the company.

The utility will dump a specified disk sector onto the video screen in a professional hex plus ASCII format. Modification of the information on disk is accomplished by typing over the displayed hex of ASCII data.

A flashing cursor, tabbing capabilities and full screen editing simplify use of the utility.

Suprdump is supplied on a mini-floppy diskette for \$29.95. For more information contact Definitive Micro Systems, 20 Glenwood Cres., St. Albert, Alberta, Canada T8N 1X5. *Circle No. 159*

Elementary Math for Apple II

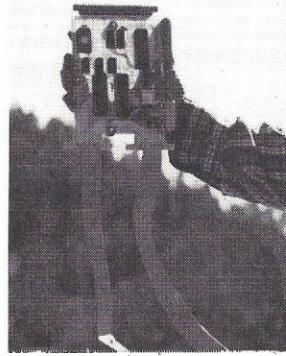
Elementary Math Edu-Disk, written and designed by a professional educator, contains an arithmetic readiness test and four interactive lessons designed to teach elementary addition, subtraction, multiplication and division, on nine different skill levels. These lessons use interactive tutorials, extensive color graphics and computer simulated voice to maintain student interest and reinforce basic concepts.

Student's scores, maintained on disk, are accessible only through a special teacher's program which is included.

The Elementary Math Edu-Disk is self-demonstrating and requires little or no instructor assistance. This program is recommended for the student with no prior arithmetic experience, and as a supplement in higher level remedial situations, according to Muse.

The program runs on an Apple II with 48K and requires Integer Basic. Price is \$39.95. For more information contact Muse Software, 330 N. Charles St., Baltimore, MD 21201; (301) 659-7212. *Circle No. 156*

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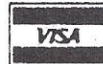
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Single unit prices start at \$595. Delivery is stock to 4 weeks after receipt of order. For more information contact iPEX International, Inc., 16140 Valerio St., Van Nuys, CA 91406; (213) 781-0020. *Circle No. 109*

Network System for Corvus Disks

A multiplexer from Corvus Systems can transform from two to 64 personal computers into an interactive multi-user network sharing high speed access to up to 40 million bytes of Corvus hard disk capacity.

Called the Constellation, the unit is suitable for many business and educational applications now limited to one dedicated computer and a small data base, Corvus said. In addition to sharing open or secured access to the data base, computers in a Constellation network can share peripherals.

Constellation is a back-end local network in which multiple computers are connected in a star configuration. To insure compatibility and future expandability, each computer interface uses the standard Corvus bus, the same as that employed in the Corvus disk system and the Mirror backup.

The center of the star is the Constellation host multiplexer. This central node contains hardware that polls up to eight computers in a round robin fashion. A two-level network containing up to eight host multiplexers connected to a central multiplexer allows up to 64 computers to share the disk.

All computers in the network are active—the central node is the Constellation multiplexer, not a dedicated computer. Total capacity of the disk system is up to 40 megabytes (four eight-inch Winchester disk drives). The company noted that you can implement a Corvus disk system as a simple one-user computer system and later upgrade to a multi-user network with no penalty in cost or software effort.

Any personal computer compatible with the standard Corvus disk system is compatible with the Constellation. These include the Apple, TRS-80 Models 1 and 2, S-100 Bus, Altos and LSI-11. The computer interface hardware is the same as that used by the single-user disk system. The Constellation operating system software is the unmodified operating system provided with the host computer, assuring application compatibility.

Price of the Constellation multiplexer is \$750. Interfaces for the computers in the network are about \$235 each. Deliveries are now being made on a 30 day basis. For more information contact Corvus Systems, 2029 O'Toole Ave., San Jose, CA 95131; (408) 946-7700. *Circle No. 112*

* EDUCATIONAL SOFTWARE* For TRS-80* Microcomputer

THESIS I ENGLISH FUN: LII, 16K by L4

Contains 5 programs designed to aid children in word usage and spelling. The programs are aimed at elementary school children, but could be easily modified for any grade level.

1. **Guessword**-(Grade 6+) Based on the popular TV game, this program asks the child for a synonym to the word. Points are scored for giving the correct word. Up to two people could play this game.
2. **Wanted**-(Grade 4-8) The words are fugitives and you are the detective. Clues for the words are displayed like an FBI wanted poster. Can you track down the words with the given clues?
3. **Fish**-(Grade 3-6) Played like the card game 'Fish', the player and the computer are dealt 'word' cards. Ask the computer for the homonyms to your cards. Score two points for each pair of homonyms. Try to make more word-pairs than the computer.
4. **Word-Mate**-(Grades 3-6) Both you and the computer are dealt 'word' cards. Match two of the words in your hand to form a compound word. The computer will do the same. Try to match all the words in your hand before the computer does.
5. **Word Scramble**-(Grade 1-4) There are five levels of play in this program. A scrambled word appears on the screen and the player must try to unscramble the word. The words in the DATA list are the 250 most common words introduced to children at the lower reading levels.

*All the programs purchased on disk (requires 32K) contain sound effects.

5 program cassette package \$25.00
5 program disk package \$25.00

SUPER ADD: LII, 16K by C.L.S. \$24.95

Designed to improve addition skills for children and adults alike. The program is divided into three categories-kindergarten, basic and C.L.S. facts. Each level presents timed problems. If the problem is not answered in the allotted time, visual aids (asterisks and pound signs) representing the values of the problem will appear on the screen. If an incorrect answer is given, the correct answer will be given and the problem will be reviewed with the user before going on to the next problem. The program is subdivided into 36 learning modules, each progressively more difficult. This program also has an optional reward feature. If desired, the program will reward the user with a game after the module is completed.

SUPER MULT: LII, 16K by C.L.S. Cassette \$24.95

Divided into 25 learning modules, the user can learn to multiply at progressively more challenging levels. The user sets the timer for the amount of 'thinking' time that he wants. If the problem is not answered in that time period, the correct answer appears on the screen and the problem is reviewed with the user before progressing to the next problem. This program also has the optional reward feature as a positive reinforcement tool.

SPEED READER: LII, 16K by I.S. Cassette \$ 7.95

As your eyes move along, reading this sentence, do you see the words like this? Most people's reading speed is limited because they look at individual letters or words. The Video Speed-Reading Trainer package can help you improve your reading speed and comprehension so that you can quickly grasp whole words and phrases.

Using the scientific principle behind the tachistoscope, a mechanical device used to flash characters or words on a screen, this three-part package will train your eyes and mind to quickly recognize numbers, letters, words, and phrases.

The programs take you step-by-step through a systematic training procedure. You'll be able to start at your own level of competency and progress as fast as you want. The computer will monitor your progress and automatically advance you as your reading speed and comprehension increases.

Increase your own baud rate with the Video Speed-Reading Trainer package.

CHALLENGE: LII, 16K by Richard Taylor \$ 9.95

Your challenge is to guess the hidden phrase. Guessing the wrong vowels means a forfeiture of 10 valuable points! Use the phrases in the program, or enter your own phrases. Program has fast graphics and SOUNDS to match. Up to two people can play this 'challenging' game.

TYPING 1 & 2: LII, 16K by C. Ashmun Both for only \$18.95

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Upper/Lower Case Board for Apple II

M&R Enterprises has introduced a new plug-in intelligent board called Sup'R'Terminal for the Apple II microcomputer which converts the screen to an 80 column, upper/lower case display.

Pascal, timesharing, word processing and bookkeeping all use the standard 80 column typewriter page width. Sup'R'Terminal allows Apple II and most other microcomputers which could only display 40 columns of upper case type to now go to 80 columns, upper/lower case.

More businesses will start using Apple computers for timesharing, especially, and major word processing systems, including Easywriter have already adapted their software packages to the new board, the company said.

Sup'R'Terminal converts the Apple II screen to an 80 column x 24 line, upper/lower case display using a 5x8 dot matrix, ASCII character set. The user-installable board plugs into slot #3 on the Apple II, connects to the monitor via an RCA connector jack and is automatically accessed in Pascal or by typing "PR#3" when in Basic. It is also fully compatible with all Apple II versions of Basic and Pascal, and several software companies are adapting their programs to it.

Peripherals such as disk drives and printers are fully compatible with Sup'R'Terminal, which is designed to work with older systems and newer systems — including future upgrades — without modification.

Software includes: upper/lower case shift, cursor movements (ESC ABCD and ESC IJKM), cursor modes, scrolling modes, scrolling controls, clearing and linefeed functions, variable scrolling window and character definition.

You can define your own 5x8 dot matrix characters and instantly switch back and forth among up to 10 different character sets, so you can define and access languages with different alphabets, scientific notation, graphic symbols and more. These user-defined characters can be printed out by using a user-programmable dot matrix printer.

Sup'R'Terminal can act as a self-contained terminal for timesharing and other applications when used with Apple's communications interface board or D.C. Hayes modem. M&R's Videobalance Circuit provides superior screen quality when the board is used with an inexpensive 8 MHz black and white monitor (the board cannot be used with a television set, which doesn't have the bandwidth or resolution needed to display the smaller characters), the company said.

The board is synchronous with the Apple II, which increases its speed of operation, and an effective baud rate in excess of 10,000 enables fast clearing and scrolling.

A detailed instruction manual accompanies the new board, including short programs for use with character definition, interfacing to timesharing phone modems and so forth. Suggested retail price is \$395.

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CIRCLE 36

WHAT'S COMING UP

Demonstration terminals have been shipped to Apple dealers and those interested in further information should contact their local Apple dealer or M&R Enterprises, 418 Arguello Blvd., Suite 2, San Francisco, CA 94118; (415) 386-3238. *Circle No. 100*

S-100 Calendar/Clock

You can add Real-Time Calendar/Clock capabilities with Mountain Hardware's 100,000 Day Clock for S-100 computers. This Calendar/Clock board features crystal-controlled accuracy and on-board rechargeable battery to keep your clock running during computer down times.

The clock will keep time and date in 100 μ s increments for periods as long as 100,000 days (273 years). An interrupt feature can be programmed for any change in a Clock digit for efficient use of computer time.

You set the clock by entering BCD digits at each time port. The clock stops when you enter the first digit and starts again on the first READ command. A write-protect switch prevents the clock from being accidentally stopped or changed. It can be used with most Basics.

Price of the 100,000 Day Clock is \$219 assembled and tested. Delivery is stock to 30 days. For more information contact Mountain Hardware, Inc., 300 Harvey West Blvd., Santa Cruz, CA 95060; (408) 429-8600. *Circle No. 103*

QUALITY PROFESSIONAL & BUSINESS SOFTWARE FOR THE APPLE II AND APPLE PLUS COMPUTERS

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PROGRAMMER PLUS - A 16 lesson course in Applesoft II on two full disks or super-load tape which will teach you all you need to know to program in BASIC. Lessons cover all string, math and logical operations necessary for personal, scientific or business applications. Special units teach graphics and sound to add a little 'Apple Class' to your programs. Applesoft II, Item 35. Tape, \$24.95. Disc, \$34.95.

SCIENTIST - A powerful scientific data base and statistics program which will turn your Apple into a mathematical and graphics tool. It will do simple statistics or such complicated functions as Chi-Square, Normal, Student-t, and Poisson. With the Data Base element you can build your own analytical programs. Applesoft II Disc, \$89.95.

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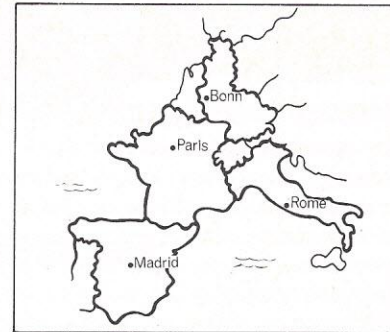
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Learn the basics of a foreign language with the Language Teacher.

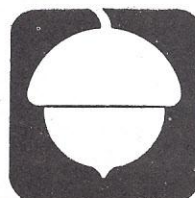
Using your TRS-80* with a single disk drive, you do the essential vocabulary study in a manner more satisfying and interesting than the traditional manner. You can currently choose among *French, Italian, German or Spanish*.

Each Language Teacher offers hundreds of word combinations, verb conjugations and phrases. You choose the topic of the drill and whether it is foreign language to English or vice versa (e.g., phrases, Spanish-to-English). There is an option of having multiple choice answers as well as being retested on missed items. The program gives a running percentage of correct answers.

Full printer capability and maximum use of INKEY\$ further enhance the program. Teachers will appreciate being able to print a quiz and the ample documentation.

Acorn produces several foreign languages in the Language Teacher series. These include *French, Italian, German and Spanish*. Each is available at only \$19.95 for a TRS-80 with one disk drive and 32k of memory. Ask for these and other quality Acorn programs at your local computer store.

* TRS-80 is a trademark of Tandy Corp.



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CIRCLE 38

Two Low Cost Printers

Okidata Corporation unveiled the Microline 82 and Microline 83, two new additions to their Microline Series of matrix printers. The rugged short line seeking, bidirectional units include extensive forms controls and features a 200 million character head warranty.

Microline 82 is an 80 column, 80 cps unit that prints dense 9 x 7 characters on three part forms up to 9.5" in width. The 136 column Microline 83 offers higher speeds and accommodates wider forms. It operates at 120 cps and handles four part forms as wide as 15". Forms controls include vertical tab, top of form and a vertical format unit that provides switch and program selection for up to ten form lengths.

The units contain two motors and will operate continuously with no duty cycle limitations. They will print standard, condensed and double width characters plus 64 block graphics shapes for charts, graphs and illustration. The block shapes may also be used to create special character sets.

Microline users do not have to purchase different printers for different forms. The new units serve friction, pin and tractor feed requirements. The standard Microline 82 platen accommodates friction and pin feed and provides short tear-off capability. Optional tractors snap in place and easily adjust to suit form width.

Microline 83 users have a choice of two platens — a

standard model for friction feed forms to fourteen inches in width and an optional friction and pin model for narrower (nine inches, pin to pin) forms. Snap-on tractors are also available for the Microline 83.

Both models are offered with Centronics-compatible parallel or RS232C serial interfaces as standard equipment. The standard parallel interface connects directly with TRS-80, Apple and other popular small computers. The standard RS232C serial interface operates at speeds to 300 bps. Other serial interface options are available with switch-selectable speeds to 9600 bps and a choice of buffer sizes.

The Microline 82 and 83 are priced at \$895 and \$1195 respectively. Okidata will continue to offer the 80 cps unidirectional Microline 80 introduced last year. Additional information may be obtained from Okidata Corporation, 111 Gaither Drive, Mount Laurel, NJ 08054; (609) 235-2600. *Circle No. 132*

Data Base Access

Users of desktop computers with an IEEE-488 interface can now access census data, mapping data and other large data bases available commercially or from government sources on nine- or seven-track tape, according to Dylon Corporation. Econometric and stock market data, and almost



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any large data bases available on commercial or government tapes, can also be accessed, firm representatives added.

Dylon 2001 and 9001 half-inch tape systems provide IEEE-488 (GPIB) desktop computers with fast access to information which may be available only on nine- or seven-track tape. Once the IEEE-488 desktop computer has half-inch magnetic tape, it can read selected files or records, such as census tract demographics, into memory.

IEEE-488 desktop computers may also generate data written to half-inch tape for later analysis by an in-house mainframe. Automatic conversion of ASCII to IBM EBCDIC tape formats takes place under software control within the Dylon tape system.

Seventeen commands control the interface between the desktop computer and the tape transport.

A dedicated Z-80A microprocessor manages the IEEE-488 bus interface, formatter and tape transport functions within the system. Systems are configured in a variety of reel sizes and densities, with tape speeds up to 75 inches per second, the company said.

Dylon systems can accommodate record lengths of up to 16,384 characters and storage densities up to 40 MB on one reel of tape. The Dylon half-inch tape systems may include as many as four tape transports depending on the applications.

Prices for the complete system start at \$7995. Current delivery is within 60 days. For more information contact Dylon Corp., 3670 Ruffin Road, San Diego, CA 92123; (714) 292-5584. *Circle No. 130*

Low-Cost Printer

A new dot matrix printer introduced by Vector Graphic makes it possible for you to purchase an integrated system.



In addition to its speed and its graphic capability, the Vector Graphic MP printer features quiet operation due to extra soundproofing designed into the case.

The 5 x 7 dot matrix printhead is software driven and can print an almost endless array of graphic characters at a print speed of 150 cps, depending on your requirements, the company said.

Base price of the Vector Graphic MP printer is under \$1000. For more information contact Vector Graphic, 31364 Via Colinas, Westlake Village, CA 91361; (213) 991-2302. *Circle No. 133*

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CIRCLE 42

Music Synthesizer for H-8 Computer

Heath Company has introduced a music synthesizer system which makes music with the firm's Heathkit H-8 computer. The HA-8-2 Music Synthesizer System includes a circuit board, which plugs directly into the bus of the H-8 computer, and the necessary system software, supplied on a standard 5-1/4-inch floppy disk.

Documentation shows you how to utilize the music synthesizer. The software allows you to enter any song into the system from conventional sheet music. The synthesizer board, which connects directly to any stereo system with the two shielded cables included, produces an excellent 27.5-6600 Hz fundamental frequency response with up to 9 harmonics, according to Heath.

The documentation and software supplied with the board permit use of the board and entry of songs without requiring you to read music.

A Heathkit H-8 computer with at least 24K of memory, floppy disk system and video terminal are required to use the music synthesizer system. The HA-8-2 is mail order priced at \$159.

For more information on the synthesizer system as well as the complete line of Heathkit personal computers, computer systems, hardware, software and accessories, write for a free catalog to Heath Company, Dept. 350-290, Benton Harbor, MI 49022; (616) 982-3210. *Circle No. 126*

Floppy Disk Repair Service

Trans Datacorp offers a floppy disk drive repair service for Shugart, Pertec 8-inch and Shugart 5-1/4-inch floppy drives.

The service provides not only substantial cost savings, but achieves short turn-around time along with a six-month warranty, the company said.

Quality is assured by using sophisticated computer test equipment that performs up to 70 diagnostic checks, the company said. Test format is also tailored toward IBM compatibility and other special recording applications.

In addition, Trans Datacorp refurbishes disk drive spindles, actuators and optical transducers, and manufac-

tures optical image conduit and velocity encoders for tape drives. They are also involved in solving disk drive problems and have been a consultant to many companies in the development of new disk head technology.

For more information contact Trans Datacorp, 1717 Old County Rd., Belmont, CA 94002; (415) 591-5705.

Circle No. 127

SYSTEMS

Advanced Computer for Business Use

The new "Control Center 2," a modular business computer from Infotecs, can be expanded, in economical increments, from a basic, low-cost system to one utilizing more than 32 peripheral devices (terminals, printers, etc.) and approaching large, expensive computers in its capabilities and on-line storage capacity, Infotecs said.

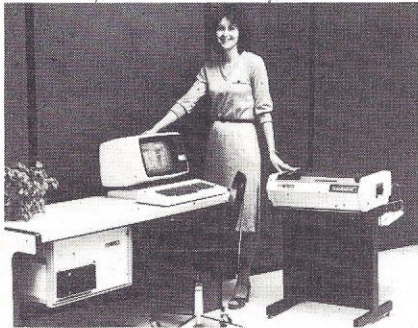
Additional floppy disk drives and cartridge disk drives can be added to provide a total on-line storage capacity of over 800 million characters. Up to 16 CRT/keyboard terminals can be used. The number of printers can be expanded to 24, including 8 system printers plus 16 printers associated with CRT/keyboard terminals. Communication is available through an RS-232 interface.

The basic system consists of a CRT/keyboard terminal, a 150-character per second impact printer and a control cabinet which houses a high speed floppy disk dual drive (with space for a second drive), two plug-in processor boards (with provision for a third) and a power supply. The system is available with a number of complete, field-proven software packages which cover a range of business needs. The system runs all software developed for earlier Infotecs computer systems such as General Accounting, Fuel Oil, Wholesale/Retailing, Insurance Agency Accounting, Job Cost Control, Order Entry, Inventory Control and others.

Instead of the usual single central processing unit (CPU), the system utilizes multiple dedicated processing units (DPUs), which concurrently

control the operation of various system elements, the company said. As devices such as CRTs and printers are added to the system, additional DPUs are added to control them. This eliminates the problem, common to many computer systems, of increased traffic load through the CPU, with its resulting slow-down in operating speed.

Five different option boards can be plugged into the 32 slots available. Each board functions as a controller for a device (or devices) and each includes its own microprocessor with 32K bytes of memory. The five boards are a CRT and printer controller, a multiprinter controller, and a general purpose controller used for communications and other devices.



The CRT/keyboard terminal's keyboard is separate from the display unit for operator convenience. The keyboard has a 97-key layout, with standard typewriter features and a numeric keypad for entering numbers. The CRT's 12-inch viewing screen displays 1920 characters in a 24-line by 80-character format and may be tilted on its base for operator comfort.

The floppy disk drive utilizes two single-sided, double-density diskettes with a storage capacity of about 1 million characters each. Provision is made in the control cabinet for a second drive, providing a total on-line storage capacity of about 4 million characters.

Further expansion of mass storage capacity is available through addition of cartridge disk units available in 34, 68 and 102 million character capacity. A removable cartridge holds 17 million characters in each of the three configurations and the remainder is fixed. Up to eight of these drives can be added to the system.

A selection of four printers is available. In addition to the 150-cps unit,

there is a 340-cps dot matrix model, a 300-line per minute band printer and a 55 cps letter-quality printer.

The basic system is priced at \$11,500. With a cartridge drive, it is priced at \$20,000. For more information contact Infotecs, One Perimeter Rd., Manchester, NH 03103; (603) 624-2700.

Circle No. 129

Multi-User Multiprocessing Z-System Computer

Micromation has introduced the Multi-User Z-System Computer, a multi-user microcomputer that implements multiprocessing, with discrete CPU and 64K RAM memory for each user. The system supports up to four users; each user can execute any CP/M software using the 62K transient program area provided for each station. Because the workstations employ discrete CPU and memory, different users can simultaneously run programs coded in different languages.

Any standard CP/M program is executed at each workstation while a Master Z-80A CPU runs an enhanced version of MP/M, arbitrating bus usage and performing I/O functions for the satellite workstations. The system is fully interrupt driven for fast operation.

Modular design enhances throughput, increases reliability, and eases field maintenance and upgrades. This modular capability means the system builder can expand a dual floppy, single user system easily, adding additional users and Winchester hard disk as required, without obsoleting any of the beginning components.

A four-user system with hard disk requires eight circuit boards on the S-100 bus: a Master Z-64, Multi-User I/O, four Z-64 Satellite boards, Hard Disk Controller, and Doubler Floppy Controller (providing IBM Standard single density compatibility in either of the two standard drives.) These eight components provide 320K RAM, four independent CPUs, single and double density floppy control for up to four drives, 20 megabytes of Winchester storage, four terminals and two printers, and a real-time clock.

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CIRCLE 44

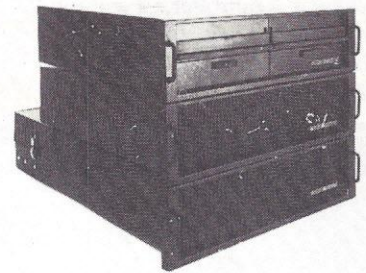
tion of single board computing with the flexibility of the popular S-100 bus, Micromation said. At the heart of the S-100 system, the Z-64 CPU board contains a Z-80A microprocessor and 64K dynamic RAM operating at a full 4MHz. Because one board combines

both the CPU and RAM, the system operates with transparent memory refresh and no wait states.

For each workstation, the Z-System provides a Z-64. Each station executes at 4MHz speed — as fast as the fastest stand-alone Z-80 system. A failure on

one user's board does not interfere with operation of the rest of the system.

Micromation's Master/Satellite configuration simplifies bus arbitration, because satellites do not need direct access to I/O ports, the company said. A Z-64 board serves as Master I/O Processor, storing and executing an enhanced version of the MP/M operating system and arbitrating bus usage among the Satellite boards. The multi-user configurations then add one Z-64 card for each workstation (up to four).



The multi-user system employs the Shugart SA4000 series Winchester disk with 20 megabytes of mass storage. For reliable back-up, the Micromation Hard Disk Controller talks to the Doubler floppy controller, freely reading and writing files from either single or double density floppy to the Winchester disk and vice versa.

The floppy disk subsystem includes the Doubler controller, containing IBM single and 20 compatibility; 2 8" drives, either 1 side or 2 side; and 1 or 2 megabyte capacity.

A four-user system is priced at \$15,995. For further information contact: Micromation, 1620 Montgomery St., San Francisco, CA 94111; (415) 398-0289. *Circle No. 239*

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ATTENTION BARGAIN HUNTERS!

New Small Business System

Vector Graphic Inc. has announced the addition of the Vector System 2800 which consists of a Vector 3 terminal with the recently introduced ZCB single board computer together with 64K of RAM (56K useable) and a disk controller and a Flashwriter II video board featuring an 80 x 24 display.

The second major component in the system is the Dualstor 8" drive unit with a total capacity of 2 megabyte-for-

WHAT'S COMING UP

matted. The formatting is IBM compatible. The drives have an access time of 91 milliseconds and transfer time of 500K bits per second. The standard software on the System 2800 is CP/M (which runs 4 times faster on the System 2800 than on the System B), Micro-soft Basic-80, Raid debugger, Scope editor, the five Peachtree accounting packages including General Ledger, Accounts Payable, Accounts Receivable, Payroll and Inventory control programs and Memorite Word Management are available options.

The System 2800 offers the best price/storage ratio currently available in the small business system market, the company said. The 2800 broadens the Vector product line by offering a system that provides more than two megabytes of storage as compared to 630K bytes on the System B and 32 megabytes on the System 3030.

Suggested retail price is \$7295. For further information contact Vector Graphic Inc., 31364 Via Colinas, Westlake Village, CA 91361; (213) 991-2302. Circle No. 238

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CIRCLE 52

COMPLEMENTS

Report on Personal Computers

In a new report, *All About Personal Computers*, Datapro traces the development of the personal computer, discusses applications and future trends, and outlines how to buy a computer. Also featured in the 62-page report are detailed individual reports on 15 of the best-selling personal computers and directories listing vendors of small/personal computers, software, peripherals and publications.

In addition to reports on the three leading systems — the Radio Shack TRS-80, the Commodore Pet and Apple Computer's Apple II — *All About Personal Computers* provides detailed reports on the Atari 400 and 800, the Compucolor II, the Cromemco Z-2, the Exidy Sorcerer, the Heath H8, WH8 and H88/H89, the Hewlett-Pack-

ard 85, the Mattel Intellivision, the North Star Horizon, the Ohio Scientific Challenger I and II and the TI 99/4.

Directories list 47 personal computer manufacturers, 497 software vendors, 448 peripherals vendors and 19 publications. Tracing the history of the personal computer industry from its birth in 1975 to today's boom, the report estimates that more systems will be sold in 1980 and 1981 than in all the previous years put together.

According to the report, only half of the installed personal computers today were bought for "home" use; the rest were bought for educational (20 percent), professional (20 percent) or small business (10 percent) applications.

There are already nearly 1500 discrete applications for personal computers, the report says. Leading applications include game playing, text editing, music generation, general ledger accounting, education, speech recognition/generation and inventory control. Others include income tax prepa-

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- **California:** Michael Reynolds, 924 Westwood Blvd., Los Angeles, CA 90024; (213) 478-3017.
- **Japan:** K. Yanigihara, International Business Corp., 10-10 Shinjuku 3-chome, Shinjuku-ku, Tokyo, 160 Japan; (03) 350-0272.

WHAT'S COMING UP

ration, stock/bond analysis, recipe storage, sales records, real estate investment analysis, home budgeting and record keeping.

One of the most powerful applications, the report notes, is remote access to other small systems and to the wealth of information stored in commercial data bases. Airline schedules, news, stock prices and other types of information are available. Connection is via local telephone call to a public data communications network that connects the user to a computer center.

Sales and service support for personal computers still comes primarily from the computer stores that have sprung up around the country and from Radio Shack's thousands of outlets. But three new sources are growing: department stores, "retail stores" run by computer companies and office equipment dealers.

All About Personal Computers provides a guide to this new world of electronic companions, whether you are

interested in buying a computer or simply want to keep track of the action. *All About Personal Computers* is available for \$25 per copy. For more information contact Datapro Research Corporation, 1805 Underwood Blvd., Delran, NJ 08075; (609) 764-0100.

Circle No. 134

Programming Worksheet

A new worksheet called a *Basic Structured Programming Form*, by Gil Held, has been published by Hayden Book Company, Inc. This programming tool enables you to write your Basic language statements in pencil before entering them into the computer. By using this form, you can make any changes in your program before you begin the final version.

Price for 500 sheets is \$2.95. For more information contact Hayden Book Co., Inc., 50 Essex St., Rochelle Park, NJ 07662. Circle No. 139

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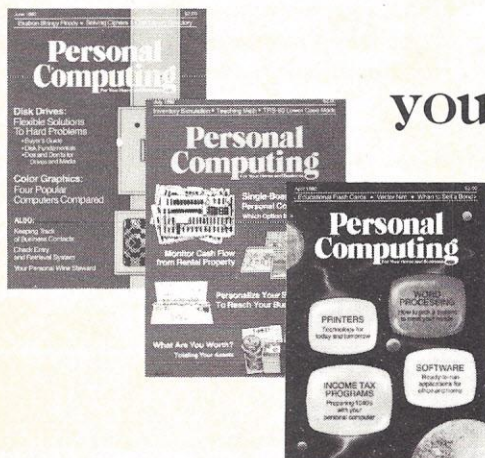


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CIRCLE 53

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Update your files with **Personal Computing** back issues. Past issues contain articles on computer basics and getting acquainted with your personal system, programs for business and home use, educational applications, programming tips and suggestions on getting the most from your computer — plus much, much more.

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CIRCLE 54

Got an unusual application?

If you use your computer for an interesting, intriguing or unusual application (or know someone who does), our readers would like to hear about it. Why not write up a short (500 to 1000 words), original article telling us about it? Make it light and newsy, and include black-and-white photos if appropriate. Send your submission to Random Access, Personal Computing, 1050 Commonwealth Ave., Boston, MA 02215.

WHAT'S COMING UP

Literature on Pascal Programming Language

A booklet describing the uses and benefits of the Pascal programming language, along with a brief history of other languages, is available from Ramtek Corporation.

The eight-page, two-color pamphlet entitled *Pascal, A Programming Language For Today* is part of the new "Ask Ramtek" series, and details nine benefits of Ramtek's approach to Pascal over other generally popular programming languages. A comprehensive chart compares Pascal feature by feature with Basic, Fortran and Cobol.

Ramtek supplies computer color graphics capabilities in the Pascal programming language. Their software package, Pascal Graphic Procedures (Graphpro), is written in UCSD Pascal and is used with Ramtek's 6000 Series Colorgraphic computers. The package permits users unsophisticated in graphics to develop comprehensive applications with a minimum of programming, the company said.

For information or a free copy of the booklet contact Ramtek Corporation, 2211 Lawson Lane, Santa Clara, CA 95050; (408) 988-2211. *Circle No. 228*

Carrying Case for TRS-80

A set of attache style carrying cases for the TRS-80 computer has been introduced by Computer Case Company. The basic case will hold the keyboard computer, the expansion unit and a tape recorder or up to two disk drives in a fully operational configuration, eliminating need to disconnect and reconnect cables each time the computer is moved. Simply plug in the power cable, connect the monitor and operate.

A power strip is also provided so that all the equipment can be powered from a single source. The removable lid has storage space for manuals, disks and working papers. The computer and disk drives (or tape recorder) are held in position with security straps and cradled in foam rubber for protection.

The cases are of luggage material covered in brown leather-like scuff resistant saddle stitched vinyl with padded handle, lock, furniture protecting pads and steel skids.

The optional RF-modulator allows any TV set to be used as a monitor, making it unnecessary to transport the monitor. A case is also available which will carry the monitor along with other accessories such as a modem or mini-printer. A separate case is also available for the Line Printer II.



Cases provide not only portability but a convenient method of storage free from possible damage and dust accumulation. By replacing and locking the lid the computer and software are protected from tampering and unauthorized use. Access is controlled without the necessity of dismantling the setup. Cables are protected from inadvertent damage or failure due to connecting and disconnecting.

The basic computer case sells for \$109 and the monitor case for \$84 and the Line Printer II case for \$89. The optional RF-modular is available for \$24. A matching attache case is also available. Contact Computer Case Co., 5650 Indian Mound Ct., Columbus, OH 43213; *Circle No. 135*

Correction

A product announcement by Dennison Kybe Corporation, published in the July *PC*, contained errors in pricing on a new family of flexible disks and magnetic cards.

The correct suggested list prices are as follows: 8" flexible disks start at \$3.35. 5-1/4" mini flexible disks are priced from \$3.40. IBM compatible magnetic cards are priced from \$9.25 per box of 25.

Dennison Kybe apologizes for any inconvenience the errors may have caused. Dennison Kybe Corp., 132 Calvary St., Waltham, MA 02154; (617) 899-0012. *Circle No. 138*

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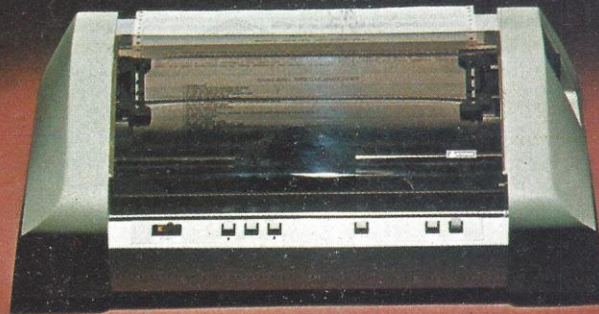
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CIRCLE 59



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Introducing two totally new alphanumeric line printers from Anadex – Models DP-9500 and DP-9501 – featuring 132/175 or 132/220 columns, respectively.

Both models employ a new, Anadex-manufactured 9-wire print head with 150 million character life (optionally, 650 million) that makes them ideal for high-resolution printing requirements including high-density graphics where print quality and reliability must go hand in hand.

The full standard 96 character ASCII character set, including descenders and underlining of all upper and lower case letters, can be printed bi-directionally on up to 5 crisp copies at speeds up to 200 CPS. Adjustable-width tractors, accommodating paper from 1.75 to 15.6 inches wide, allow the printers to adapt to your application.

The three ASCII compatible interfaces (Parallel, RS-232-C, and Current Loop) are standard in every printer; so interfacing is usually a matter of “plug it in and print.” With simplified interfacing, the printers also feature sophisticated communications capability including control of Vertical Spacing (6 or 8 lines/inch), Form Length and Width, Skip-Over Perforation, Auto Line Feed, and full point-to-point communications capability.

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